Servitization Transformation Process:

A Longitudinal Case Study

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2020

PhD MGMT 790 –PhD Thesis

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Being able to have room to think is the greatest freedom
The development of spirit
The possession is insight

Insight to exist without muddle
With an inner intelligence
To push yourself to the extreme and not worry about consequence

Believe in yourself and the curiosities you can produce
The result will be rewarding

Julie Donovan 1993

To the people who helped support me through my PhD journey, too many to mention however special mention to my partner in life, Paul Rogers, who has been a constant source of support and positivity throughout. To Pavel Castka, my supervisor, friend and inspiration from start to finish. To the ladies, Wendy, Sarah and Brittany who work in the coffee shop I visited most mornings who tended to me with coffee and bagels while I read and scribbled on bits of paper.

I would also like to dedicate this work to my parents who passed away in 2018, my mother in February and my father in November who always encouraged my quest for knowledge – you are woven into the pages of this thesis.

Abstract

Manufacturers are pursuing a servitization strategy because they can no longer compete on products alone. They are facing strong competition from East Asian countries who are dominating in the high volume, low cost product market which is stagnating product demand. Customers are also demanding services be performed by their suppliers as they outsource non-core business activities. Servitization, recognized by scholars as the process of combining value-added services with products, is a way in which manufacturers can remain business sustainable in a competitive market. Researchers add that the servitization process is fraught with obstacles and that firms need to develop existing capabilities in order to raise barriers to competition and sustain business revenue. This case study research develops an understanding of how businesses remain sustainable when servitizing through the lens of dynamic capabilities. A comparative case study provides evidence of varying use of dynamic capabilities at work resulting in different rates of servitization success. Findings demonstrate that firms seize opportunities from mobilizing collaboration with their supply chain partners; transform their organization by being responsive and flexible to changes in managing the service paradox and reconfigure their unique relationships to be strategically aligned to secure new markets. Our study details the interlinkages of how these dynamic capabilities address and mitigate challenges in the process. These capabilities lead to the business achieving and remaining sustainable in servitizing manufacturing. The findings are grounded in the context of manufacturers and provide a useful framework for others to investigate a firms' sustainability in servitization.

Key Words: *Servitization, Product Service Innovation, Dynamic Capabilities, Service Paradox*

Chapter 1: Introduction

Researchers propose that servitization is a way of addressing the competitiveness of manufacturing firms by innovating with value-add services (Brady, Davies, & Hobday, 2006; Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003; Prakash, 2011; Wise & Baumgartner, 1999). Servitization is a transformation process by which a firm provides an "increased offering of fuller market packages or bundles of customer focussed combinations of goods, services, support, self-service, and knowledge in order to add value to core product offerings" (Vandermerwe & Rada, 1988). Studies suggest that services in general, have higher margins than products and provide a more sustainable source of revenue. It is how services are combined with products that provide innovative high-value, integrated solutions and achieve competitive advantage (Davies, 2004; Johnson & Gustafsson, 2003; Penrose, 1959; Sawhney, Balasubramanian, & Krishnan, 2004; Wise & Baumgartner, 1999).

One of the motivations for manufacturers to consider servitization is due to the fiercely competitive economic environment influenced by strong East Asian competition in high-volume manufacturing and a growing selection of similar products which was stagnating product demand (Davies, 2004; Wise & Baumgartner, 1999). As a result, servitization has been recognized as a way to deal with competitiveness in the global market and has been highlighted by many governmental initiatives. For instance, the New Zealand (NZ) Government lists this issue as one of the key success factors in the growth of NZ's Manufacturing sector (MBIE, 2012, 2018).

Recent literature suggest that questions still remain unanswered in terms of the process of servitization transformation (Baines et al; 2017;Baines, 2019 et al). Leveraging existing capabilities and developing new ones is an important aspect of servitization transformation. In the environments that are globally competitive, fast-moving and geographically dispersed,

"to achieve sustainable competitive advantage requires more than just difficult to replicate assets, it also requires difficult to replicate dynamic capabilities" (Teece, 2007). In the realm of servitization, researchers advocate that there is to be further understanding of the transformation of capabilities especially in the context of manufacturers (Kowalkowski, Gebauer, & Oliva, 2017). There is a lack of studies that monitor the servitization outcome and the development of dynamic capabilities over time (Kindström, Kowalkowski, & Sandberg, 2013; Oliva & Kallenberg, 2003). Organizations with strong dynamic capabilities shape their own business ecosystems through collaboration with other enterprises such as customers and supply chain partners to remain sustainable (Augier & Teece, 2009; Bustinza, Parry, & Vendrell-Herrero, 2013; Ettlie & Rosenthal, 2012; Kogut & Zander, 1992; Teece, 2007).

The transition from a manufacturer to a service provider often means a radical revamp of firm's operations both internally and through extended supply chains, revamping of financing, ownership structures or human resource policies to name but a few (Baines et al., 2017). Successful servitization could be beneficial to a firm yet at the same time servitization presents a significant risk to firms. For instance, firms might find it difficult to resource the servitization transformation and end in bankruptcy (Benedettini, Neely, & Swink, 2015). Firms that remain sustainable during the servitization are therefore under increased pressure and this is particularly important in the context of small firms – who often have scarce resources. Due to a lack of studies that monitor servitization outcomes and the development of dynamic capabilities related to the outcomes over time, this study investigates *how manufacturing firms remain sustainable during servitization*.

This study is grounded in dynamic capability perspective (Teece, Pisano, & Shuen, 1997) and focuses specifically on understanding the mechanisms through which firms ensure the development of servitization capabilities that ultimately become dynamic capabilities

(hard to imitate and create value). In order to understand the development of capabilities over time, a longitudinal comparative case analysis was conducted (Eisenhardt, 1989) in six case study organisations in New Zealand between 2015-2018. The unit of analysis is a firm that has been servitizing and the sample consists of firms that are considered "exemplars" in their approach to and potential from servitization. The case study organisations were identified from governmental reports and these firms were promoted as leaders in their industry by the government. This means that the case study organisations showed a sustained high performance and records of long-term sustainable in their manufacturing (the secondary data was obtained from several sources such as the Technology Investment Network report (TIN, 2016) to clarify firm's sustainable prior to the servitization process). Even though there are purposefully chosen as exemplar firms, not all firms have succeeded in their servitization: one firm went bankrupt during the study and another firm was unsuccessful and was sold purely as a manufacturing firm (also during the research). The study therefore provides a rich context and combines a set of firms which, on the one hand, remained sustainable and generated revenue streams through servitization, and on the other hand, firms that did not remain sustainable or bankrupted.

The primary data was collected at firms' premises at two stages. The first stage of research aimed to determine key processes during servitization as well as initial assessment of firms transition in servitization. The second stage of primary data collection (about two-three years later) provided the data on the transition progress. Primary data from firms (interviews, documents, etc) were enhanced by data collected from the governmental reports media articles and interviews with industry experts.

The study is qualitative in nature and uses qualitative data analysis (Miles & Huberman, 1994). The analysis started with a within-case analysis of each company to understand how firms approached servitization. An emerging coding approach was used to identify the

approaches and capabilities. The coding resulted in 34 first order indicators that were later grouped into 9 second order indicators, resulting into three high order constructs. The three high order constructs reflect dynamic capabilities, which firms were developing during the servitization process. Each high order construct is described by a set of mechanisms, which essentially captures how firms ensure their sustainable during the servitization transition, namely:

- *Product/Service Development capability* primarily led to a firm's ability to introduce *new product/service offerings*.
- *Managing Service Paradox capability* primarily contributed to *sustained business performance* during the transition.
- *Securing Market* capability primarily contributed to achieving *lower levels of competition* from other firms.

The study also concludes that successful servitization is associated with simultaneous pursuit of all three capabilities. It contributes to a growing literature on servitization transformation and provides a framework that explains how firms remain sustainable during the transformation. The study details the interlinkages of these dynamic capabilities and explains how firms address and mitigate challenges in the servitization process. The findings are grounded in the context of dynamic capabilities and the context of manufacturers and provide a useful platform to investigate the issue of firms' sustainability in servitization in a larger sample.

At the practical level, the result serve as a template for future businesses to understand servitization as a developmental, evolutionary process in adding services and solutions rather than a "just simply adding services" strategy which is fraught with additional challenges (Gebauer, Fleisch, & Friedli, 2005; Gustafsson, Edvardsson, & Brax, 2005). This study is important for manufacturers that are considering servitization; to be aware the critical aspects

of servitization in planning their strategic goals and objectives, organizational arrangements, length of transition period and realistic financial arrangements.

The thesis is organized in the following way. Chapter 2 provides the review of the servitization literature. It also reviews literature on dynamic capabilities and provides a discussion of the research gap. Chapter 3 discusses the research method that was used for this study, it also provides a detailed account of the data sources and approach to data analysis. Chapter 4 presents the findings of the study and also contains propositions about the role of the three dynamic capabilities in servitization. Chapter 5 provides discussion of the findings in the context of current literature and highlight its contributions. This chapter also discusses the implications, research limitations and suggestions for further research. Finally, Chapter 6 provides conclusions to this study.

Chapter 2: Literature Review

2.1 Servitization Defined

The academic literature to date has predominantly focussed on servitization as a transformation process of a business that has had a traditionally product-orientated focus, to one that incorporates service innovation into their business models. The idea of servitization was introduced by Vandermerwe and Rada in the 1980s describing it as increased offering of fuller market packages or bundles of customer focussed combinations of goods, services, support, self-service and knowledge in order to add value to core product offerings (Vandermerwe & Rada, 1988). These customer focussed combinations or servitized packages have since been defined as Product Service Systems by Baines et al (2007) as integrated product and service offerings that delivers value in use (Baines et al., 2007) and further described as having five systems such as: *Integration orientated Product Service Systems (PSS)*; *Product orientated PSS, Service orientated PSS, Use orientated PSS* and *Result orientated PSS* (Neely, 2008).

Many studies on manufacturing strategy argue that organizations should concentrate less on stand-alone physical products and more on delivering high-value service and customer focused solutions to gain higher profits (Davies, 2004; Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003; Wise & Baumgartner, 1999). Manufacturer's traditional value-chain role - producing and selling goods, has become less attractive as the demand for products have stagnated (Wise & Baumgartner, 1999). Transitioning from being a traditional product manufacturer to a service provider constitutes a new way of thinking about strategy and a major managerial challenge to the organization (Oliva & Kallenberg, 2003). Traditionally manufacturing organizations have been structured accordingly to a tight technological discipline and culture around key products. All input and resources were typically dedicated

to the research and design, manufacture and marketing of a product rather than a service (Prakash, 2011). Levitt (1972) found that often service quality driven operations were downplayed in favour of a technological approach with an understanding that technological approach eliminates discretion and promotes efficiency (Prakash, 2011). 'The Theory of the Growth of the Organization' outlines the need for organizations to move from a culture of planning and tight control of products to moving more into integrated solutions (Penrose, 1959). Penrose (1959) also recognizes that this is necessary to sustain long term growth of the organization and urges organizations to devote resources in the development of a new type of selling programme and a competence in meeting a different type of customer pressures (Penrose, 1959).

Slywotzky's study in 1996 observed that the 1990's was the beginning of a trend of organizations recognizing the need to migrate downstream from manufacturing to services. The combination of stagnant product demand and an expanded Installed Base[1] (IB) has pushed economic value downstream, away from manufacturing and toward providing services to operate and maintain products (Davies, 2004). To capture value downstream, manufacturers shifted their focus from operational excellence to customer allegiance and rethink the meaning of vertical integration (Wise & Baumgartner, 1999). The product orientation is even stronger in vertical networks, which tend to have little identification with either the final product or its end users as it is usually one of several organizations that add value to the final product (Hayes, Upton, Pisano, & Wheelwright, 2004). For example, Rolls Royce earns a growing proportion of its revenue by selling services providing them with fixed engine maintenance cost over an extended period. They are no longer reliant on one-off sales of aircraft engines. The manufacturing organization's focus is on the total value including product and service; so

[1] Installed Base - is the number of units of a product that are currently in use. Usually only used where the users must make a substantial additional investment to use and are "locked in" with respect to replacement parts, service contracts, upgrades etc.

becoming more horizontally aligned; focussing on the needs of the customers and where flexibility and product/service innovation are more important than careful planning and tight control (Hayes et al., 2004). Oliva and Kallenberg (2003) found little evidence of vertically integrated business models providing services in their study of 11 equipment manufacturers. They found that manufacturing organizations adopted horizontally aligned service delivery structures when moving into operational services (Oliva & Kallenberg, 2003).

The impetus for suppliers to migrate downstream is often linked to the impact of East Asian competition in high-volume manufacturing, stagnating product demand and a growing installed base of products reflected in the accumulation of past purchases and longer product life spans (Davies, 2004). This for instance is highlighted in the following quote from Wise and Baumgartner (1999):

> *"In the US, economic growth slowed dramatically from an average annual rate of 4.1% in the 1960's to 2.6% in the first nine years of the 1990s. The annual growth in sales of industrial machinery for example declined from 5.2% to 2.0% over this period. In many manufacturing sectors revenues from downstream activities now represent 10 to 30 times the annual dollar volume of the underlying product sales"* (Wise & Baumgartner, 1999).

By expanding the scope of the product offering to include services, organizations therefore capture an extended lifecycle of products through service provision from an installed base of products. Services are attractive because they provide continuous streams of revenue, tend to have higher margins and require fewer assets than product manufacturing e.g. Rolls Royce (Wise & Baumgartner, 1999). New Zealand has seen an increase in growth from services as well and Ministry of Business, Innovation and Employment (MBIE) has reported that:

"In New Zealand, IT technology has been averaging 11% growth since 2002. Over the last two decades High Technology Manufacturing has grown rapidly with exports rising from less than $100 million a year to 1990 to 1.4 billion in 2012"(MBIE, 2012,2018).

The New Zealand government recognizes that the top NZ manufacturers are global leaders in their markets because they generally specialize in niches and have built-up close long-term business relationships with their customers. They represent organizations that do not necessarily aim to be number one in the marketplace, trying to gain the largest number of customers to sell their products. The sturdiest barrier to competition therefore is building a strategic partnership with their customers by earning their loyalty so the manufacturer can become the preferred supplier of services throughout the product life span and beyond. This provides opportunities to offer a range of customised services that address a buyer's needs throughout the product life cycle from product conception through design and build to operation and decommissioning. For example, NZ company Tait Communications, a leading telecommunications provider, is growing its expertise in software and services to complement the design and manufacture of radio hardware that it had originally specialised in. Services now make up around 25% of revenue and Tait Communications is focused on developing software solutions that integrate with its radio platforms to deliver added value to their clients (MBIE, 2012,2018).

The academic literature to date, has predominantly focused on understanding and describing what the process is in transitioning from being a manufacturer of products to also providing services. Most researchers argue that it constitutes a new way of strategic thinking and is a major managerial challenge (Gebauer et al., 2005; Gustafsson et al., 2005; Oliva & Kallenberg, 2003; Prakash, 2011). To capture economic value, the manufacturer migrates downstream from the manufacture of a product to providing services, shifting their focus from

strict discipline around product efficiency by becoming directly responsive to the needs of the customer. They rethink the meaning of vertical integration and look for ways of moving closer to the customer by collaborating and horizontally integrating with supply chain partners (Davies, 2004; Hayes et al., 2004; Oliva & Kallenberg, 2003; Wise & Baumgartner, 1999).

The literature recognizes a set of management principles, processes and developmental pathways that empower and encourage service related values amongst the employees (DiMaggio & Powell, 1983; Ettlie & Rosenthal, 2012; Johnson & Gustafsson, 2003; Kahn, Maltz, & Mentzer, 2006; Oliva & Kallenberg, 2003; Prakash, 2011). The servitization transformation occurs by exploiting existing organizational knowledge and learning (He, Sun, Lai, & Chen, 2014; Kogut & Zander, 1992; Prakash, 2011; Schumpeter, 1934); by recognising and building on the existing capabilities of service quality, flexibility and responsiveness and apply these to customer needs (Bustinza et al., 2013; Prakash, 2011; Roth & Van Der Velde, 1991, Barney 1991). Recent literature has gone about identifying and developing the key capabilities related to servitization from the manufacturing context (Kanninen, Penttinen, Tinnilä, & Kaario, 2017; Kindström et al., 2013) and highlighting the importance of the role of technology and dynamic capability configurations through digitization (Coreynen, Matthyssens, & Van Bockhaven, 2017; Johnson & Gustafsson, 2003; Kahn et al., 2006; Oliva & Kallenberg, 2003).

However, as with any change in business direction, there are challenges with servitization. Failure to deliver service profit has been described as a business hazard or a service paradox (Gebauer et al., 2005). Substantial investment in increasing services can lead to higher costs which does not necessarily turn into profit. Researchers have indicated many reasons for this paradox. They suggest that there can be higher than expected transition costs due to a lack of setting up an appropriate service strategy and the setting of service-related goals to boost employee uptake of the changes required (Ettlie & Rosenthal, 2012; Gebauer

et al., 2005; Kogut & Zander, 1992). Teece (2010) reiterates that "without a well-developed business model innovators will fail to deliver" (Teece, 2010). Gebauer (2005) describes the "service paradox as "a lack of planning around capacity expansion and motivation to build capabilities" (Gebauer et al., 2005). Gustafsson (2005) agrees that viewing services as add-ons to a product is an inadequate strategy (Gustafsson et al., 2005) and the lack of formally identifying the type of capabilities to keep, maintain and develop inhouse is hazardous (Johnson & Gustafsson, 2003). Even in the way management enforces change e.g. in a top-down management approach can lead to a lack of employee empowerment (Sandholtz, 2012). Product manufacturers are traditionally highly structured organizations known for a strict discipline around product efficiency, tackle uncertainty and constraint with homogeneity in structure, culture and output which decries innovation (DiMaggio & Powell, 1983).

Another potential challenge can be as a result of the business failing to be flexible and responsive to stakeholders such as supply chain partners and customers. Not motivating and encouraging the distribution of information leads to a lack of knowing how much to share and a general fear of sharing (Giannakis, 2011; Penrose, 1959). Risk management planning is essential for businesses remaining sustainable during servitization (Gebauer et al., 2005). Dynamic capabilities enable businesses to create, deploy and protect the intangible assets that support superior long-run business performance (Teece, 2007). From a servitization perspective, it's not only trying to sustain and enhance performance but the need for the organizations to find ways of staying in the race by reinventing themselves on a constant basis.

2.2 The Resource Based View

Researchers have drawn on different theoretical perspectives to understand strategic management planning, scholars have drawn on the Resource Based View (RBV) (Barney, 1991) of the firm to explain a number of practices and frameworks e.g. Total Quality Management (TQM) a management approach used to analyse long-term success through customer satisfaction. Barney's (1991) resource-based theory, maintained competitive advantage results from product/service resources that are valuable, rare, unique and organised (Barney, 1991). The servitization process enables firms to create new services by developing unique combinations with products and creating value to the customer as well as providing higher entry barriers for competitors (who find it harder to imitate or innovate around and so subsequent appropriation becomes more difficult) (Johnson & Gustafsson, 2003). By integrating product and service innovation to become a core competency offering a unique proposition which is hard to imitate, this is when competitive advantage is created.

However, the RBV focuses managerial attention on the firm's internal resources in an effort to identify assets, capabilities and competencies with the potential to deliver superior competitive advantages. By servitizing, the firm utilises elements from outside of the firm and takes advantage of these elements e.g. such as external relationships that are constantly developing with existing customers and supply chain partners in a changing environment. In this study, while we identify the basis of RBV perspective of the firm in recognising their internal competencies to sustain competitive advantage, we look to incorporate an external focus is an evolving transformation of the firm. Based on the idea that unique bundles of resources form the basis of competitive advantage, the dynamic capabilities approach views sustainable competitive advantage as the ability to create, extend and modify valuable resources and capabilities over time. It is considered in the thesis that the dynamic capabilities view also focuses on developing the nature and microfoundations of these capabilities

necessary to sustain performance over time during servitization transformation in response to rapidly changing contemporary business conditions (Teece, 2007).

2.3 Dynamic Capabilities in Servitization

Dynamic capabilities make up skills, processes, procedures, organizational structures, decision rules, and disciplines, which undergird enterprise-level sensing, seizing, and reconfiguring capacities, are difficult to develop and deploy (Teece, 2007). An organization's capabilities must be inventive, innovative and dynamic in nature leveraging existing manufacturing capabilities in order to maintain superior performance in a global market. Organizations with strong dynamic capabilities not only adapt to changing business ecosystems, but also shape them through innovation and through collaboration with other enterprises such as customers and supply chain partners. Teece (2007) explains

> *"In fast-moving business environments open to global competition and characterised by dispersion in the geographical and organizational sources of innovation and manufacturing, sustainable competitive advantage requires more than the ownership of difficult-to-replicate (knowledge) assets. It also requires unique and difficult-to-replicate dynamic capabilities. These capabilities can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base"* (Teece, 2007).

Coupling and combining different capabilities, (whether these capabilities are acquired internally or externally to the organization), harnesses innovation and creates difficult-to-replicate dynamic capabilities (Ettlie & Rosenthal, 2012; Schumpeter, 1934; Teece, 2007).

Upstream manufacturers tend to focus on standards and practices that promote operational efficiency upon the creation of offerings which are their social norms. Singh and Power, as cited by Bustinza et al., (2013), reinforced this by stating that most manufacturing organizations limit the span of control to their intermediate customer and fail to analyse the complete distribution channel through to the final customer. By adding services to the product orientation requires a reconsideration of the traditional supply chain management approach. In a service environment, this requires them to interact and be responsive and agile to customers' needs. Organizations become more downstream-focussed by creating, for instance, customer-facing teams to help identify customer needs which also increase their ability to scan demand signals from the marketplace (Bustinza et al., 2013). How successful firms are is determined by how their existing knowledge assets are transformed and exploited and how they combine with new service-orientated capabilities (Bustinza et al., 2013).

Researchers maintain that in addition to the development of dynamic capabilities, firms should follow the setup of management principles and processes that empower and encourage service orientated values, interaction and responsiveness and in day-to-day work (Ettlie & Rosenthal, 2012; Oliva & Kallenberg, 2003; Prakash, 2011; Teece, 2010). Teece (2007) describes these initial capabilities as microfoundations, capabilities that not only form part of the firm's collective knowledge but also in the various organizational processes that take place. An example of combining existing organizational processes and new service-orientated capabilities was investigated in Khan et al (2006) study of 117 individual supply chain management personnel from small and large firms from the Council of Logistics Management in the U.S. Khan et al (2006) conclude:

> *"Integral-based collaboration creates the highest level of supply chain performance in terms of creating value-laden relationships as well as operational supply chain performance"* (Kahn et al., 2006).

Integral-based demand collaboration is where relational and information technology capabilities are combined to underlie the demand collaboration effort with the customers and supply chain partners alike (Kahn et al., 2006).

> "*The premise being that it is used to establish and sustain a long-term focus on effective relationships supplemented by operational efficiency for the purpose of long-term competitive advantage*"(Kahn et al., 2006).

Another example of combining product and service-based capabilities is the Ettlie and Rosenthal (2012) study which looked specifically at seven U.S. manufacturing organizations that introduced significant service innovations. They suggested that to

> "*Overcome inherent challenges around any service innovation in a traditional product orientated structure, the organization needs to understand and leverage the cultural organizational arrangement context of the innovation process*" (Ettlie & Rosenthal, 2012).

This means that people throughout the organization in different business units needed to start to work together and collaborate to share knowledge in order to get on the same working page in response to client demands. The challenge being that these are the same business units that previously not only had once competed for resources within the company, but for political power and for social as well as economic fitness (DiMaggio & Powell, 1983). For example, engineers who have legitimised themselves with behavioural norms, standards and routines around the design of products lack direct contact with the end customer and are asked to partake in new service-orientated routines such as marketing focus groups that directly involved the customer. The challenge being likened to a similar feat to learning a foreign language from scratch (Ettlie & Rosenthal, 2012).

More recently researchers have extended existing literature on dynamic capabilities in servitization by identifying the key microfoundations related to service innovation in the manufacturing context and provided empirical evidence of dynamic capabilities in the development phase of case companies service business (Kanninen et al., 2017); identified key microfoundations (Kindström et al., 2013); development of capabilities with another partner (Raddats et al., 2017); and provided an outlook on dynamic capability configurations through digitization (Coreynen et al., 2017).

2.4 Servitization Business Models and Strategic Analysis

The new environment requires organizations to create innovative business models that assist and promote the development of new competencies along with capture mechanisms for incentives and metrics for measuring success (Teece, 2010). Without a well-developed business model, innovators often fail to deliver – or to capture – value from their innovations (Teece, 2010). This is particularly true of technology-based manufacturers whose creation of revenue streams is barely recognized because their customers often receive basic services for free. To profit from any innovation, including service innovation, manufacturers need to not only be innovative but also good at business model design, understanding business design options as well as customer needs and technology trajectories. As Teece (2010) explains:

> *"Business model innovation can itself be a pathway to competitive advantage if the model is sufficiently differentiated and hard to replicate for incumbents and new entrants alike"* (Teece, 2010).

The servitization process of a manufacturing firm requires them to shift their thinking about their existing value chain and requires them not to think of customers as passive but as

dynamic, therefore requiring them to continually reassess their delivery to customer needs (Bustinza et al., 2013). In this context, competitive advantage is not simply about providing services, but how services are combined with products to provide high-value integrated solutions that address a customer's business or operational needs (Davies, 2004). Therefore the existing business model of a manufacturing organization needs updating from a traditional transactional-based strategy to embracing a relationship-based philosophy which requires the development of new capabilities and requires additional principles, structures and processes that are new and challenging to the traditional product manufacturer (Oliva & Kallenberg, 2003).

Some common themes are evident in the literature describing the organizational capabilities required for manufacturing businesses to transition towards becoming a service provider. In order to move closer to the customer, the organization needs set up collaborative mechanisms internally and externally and to encourage the transfer of knowledge and know-how. This is achieved through a transformation and exploitation of existing organizational knowledge and learning prevalent in a high technology environment (Kogut & Zander, 1992); by collaborating with supply chain partners (Oliva & Kallenberg, 2003; Prakash, 2011; Wise & Baumgartner, 1999); encouraging what they are good at: service quality, flexibility and responding to customer needs (Bustinza et al., 2013; Prakash, 2011; Roth & Van Der Velde, 1991); enhancing the use of technology (Johnson & Gustafsson, 2003; Kahn et al., 2006; Oliva & Kallenberg, 2003) and in assistance with information transfer, measuring and monitoring success and in the market delivery of goods and services when geographical distance is a factor.

2.5 Service-Related Dimensions: Quality, Responsiveness and Flexibility

Bustinza et al (2013) mentioned that the traditional concept of Supply Chain Management (SCM) seeks the optimisation of manufacturing and logistics but it is conceptually silent on customer needs; an element on which the whole supply chain is dependent when adding services (Bustinza et al., 2013). Moving closer to the customer means focusing more on the needs of the customer and that the organizations need to become more responsive and flexible towards the customer. By moving closer to the customer, it requires the organization to think of the customer as a dynamic part of the solution requiring a continual reassessment their needs. This is an opportunity for the company to be innovative in the creation of new service offerings which include a range of customised solutions rather than a set of standardised products (Bustinza et al., 2013).

The focus is to identify a total value proposition including products and services and this has led to the conceptualization of 'service quality' (Prakash, 2011). There are many definitions of service quality in the literature. At the supplier end, supplier's service quality is described as the agility of the supplier in being able to respond to sudden changes in supply, demand and external disruptions in a cost-efficient manner and involves timely and prompt service towards the focal organization (Prakash, 2011). Organizational adaptability and flexibility means the ability for the organization to adapt with the environment and changing conditions (Lee, 2004). In doing this, competence and credibility reflect the ability in

providing performance when required around promised services and by providing honest, dependable service to the customer.

In operations literature, manufacturing competitive priorities include dimensions such as design quality, delivery speed, product flexibility and low manufacturing cost (Prakash, 2011). Adding a service context, competitive priorities then include quality, price, convenience, customization and/or customer relationships (Roth & Van Der Velde, 1991). However, not all service-related dimensions are relevant for manufacturing. Prakash (2011) argues that:

> *"The most important determinants are related to quality, responsiveness and flexibility. Quality attributes include consistent service; responsiveness involves on time delivery by suppliers and flexibility involves that supplier accommodates changing needs of the customer"* (Prakash, 2011).

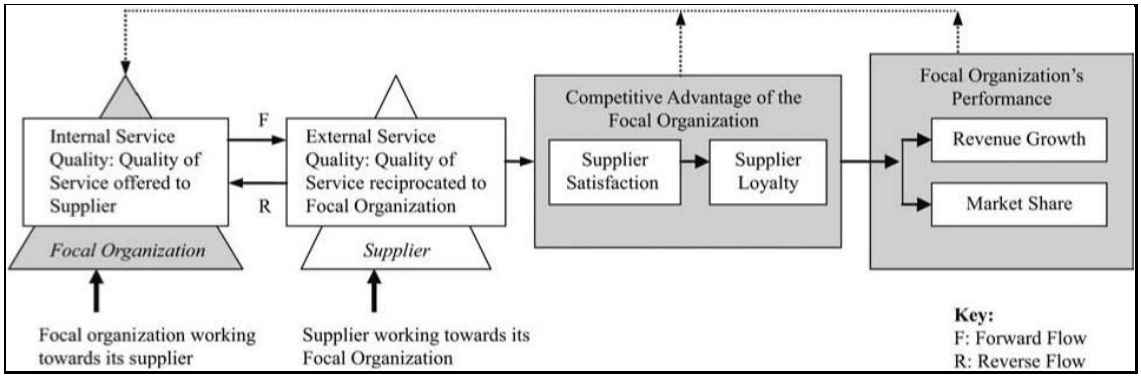

Figure 2.1: "Service Quality in Supply Chain" Prakash (2011)

Prakash (2011) adapted and applied the service profit chain concepts to the supplier-customer organization within the supply chain. Figure 2.1 illustrates the conceptualization of internal service quality and external service quality and how these constructs are related with competitive advantage and performance through intervening variables of the supplier's

satisfaction and loyalty (Prakash, 2011). Prakash (2011) study looked at three automobile companies situated in India to find whether these constructs lead to competitive advantage and improved organizational performance. Findings from this paper demonstrated that the flow of service elements embedded in the flow of products is a source of value addition for the supplier and influences the supply chain relationships. Service based business processes can strengthen business relationships and develop synchronized linkages between supply chain members. He proposed that

> "*manufacturing is a specialized case of services and that this recognition is important because traditionally manufacturing and services are considered a disjoint set of operations*" (Prakash, 2011).

2.6 Organizational Learning and Collaboration

The knowledge of the manufacturing organization is often tacit and observable, found in written standard operating procedures, manufacturing processes, technologies and in the ideas, perceptions and experience of highly skilled employees. The challenge of servitization is to build on this knowledge base and transforming it into a set of capabilities that enhance, exploit the chances for growth and survival as a solutions provider. Kogut and Zander (1992) observe:

> *"The central competitive dimension of what organizations know, is how to create and transfer knowledge efficiently within an organizational context"* (Kogut & Zander, 1992).

Organizations invest in assets that correspond to a combination of current capabilities and expectations regarding future opportunities (Kogut & Zander, 1992). In other words, the

knowledge of an organization can be considered as ownership of a portfolio of options, or pathways to future developments and profit (Kogut & Zander, 1992).

Kogut and Zander (1992) distinguish between two categories of knowledge "information and know-how". Information can be transmitted without loss of integrity once the syntactical rules required for deciphering it are known. "Know-how is the accumulated practical skill or expertise that allows one to do something smoothly and efficiently" (Kogut & Zander, 1992). Accumulation implies that know-how must be learned and acquired. The teaching of know-how and information requires frequent interactions in an organization, where groups often communicate through a unique language or code. Part of the knowledge is knowing the information of who knows what within the organization. But it also consists of how activities are to be organized in a manufacturing context i.e. by Taylorism principles with the main objective of achieving efficiency and productivity (Kogut & Zander, 1992). It is the sharing of a common stock of knowledge, both technical and organizational, that facilitates the transfer of know how within groups and the organization.

Whereas the accumulation of knowledge from cross functional group activity facilitates the creation of shared knowledge within functions, a fundamental challenge arises in the different professional language and technologies that exist between different functional groups such as manufacturing and marketing (Kogut & Zander, 1992). At this point, challenges are, for example, the identification of a distinct professional orientation conflicts with the need to integrate within the organization. In manufacturing overcoming the challenge of a set language arranged around the tight planning and control of the product and sharing this technical knowledge to other groups within the organization such as marketing who have a set language arranged around customer responsiveness, is required in order to sell new service innovations to downstream chain partners and customers.

> *"Taking care of quality of service in operations would make a shift towards marketing driven operations and development of customer driven pull based systems"* (Prakash, 2011).

It can also be a challenge as to the mechanism in which these groups are asked to integrate by management that becomes one of the biggest challenges. For example, in Sandholtz (2012) study observed when two divisions within the same company were formally directed to adopt an external standard into their norms and routines, he observed that

> "*Professionals become the objects rather than the agents of standardization, expected to follow the steps without calling the tune. This role reversal engenders an inflection point in the standardization process. To the degree that abstract external standards are enforced by managerial mandate, they become decoupled from technical work. In contrast, if internal experts (professionals) choreograph the dance, codifying their own tools and practices, the resulting standards reflect local realities and enable tight coupling between the technical core and an institutional exigency*" (Sandholtz, 2012).

Sandholz (2012) found that if management "endorses or recommends rather than adopts a standard and suggests that to achieve successful implementation of external standards the integration must occur alongside (coupled) with local occupational norms"(Sandholtz, 2012). He et al (2014) study examined the relationships between organizational empowerment, service strategy and business performance. They analyzed data from the Fifth International Manufacturing Strategy Survey. Their findings suggested that "organizational empowerment was significantly associated with service strategy and technological change played a moderating role between them" (He et al., 2014). Organizational empowerment means that employees are given discretion to make job-related decisions and are provided with enough

access to information and resources concerning company activities. They concluded that the reason why empowerment is positively related to service strategy is that quality service emphasizes flexibility and responsiveness, and this often involves making decisions around scenarios at unexpected times that have uncertain outcomes. Employees are involved in service activities must make quick decisions e.g. customers often want quick response to a request. Secondly, a successful addition of the service business to a manufacturing firm requires enthusiastic and long-term commitment from employees. When employees felt that management were looking after their needs they found meaning in their work and took better care of their customers"(He et al., 2014). This finding suggests that management should empower or motivate groups of employees to work together to integrate new service capabilities with their traditional product-focused customs. This leads to a pathway to sensing and seizing opportunities and adopting new capabilities and organizing principles needed of a new selling program for the organization.

Product orientated manufacturers exist as their own communities within which varieties of functional expertise are communicated and combined by a common language and organizing principles. When close integration within a supplier or buyer network is required, long-term relationships embed future transactions within a learned and shared convention (He et al., 2014; Prakash, 2011). In this wider perspective, an organization's knowledge consists also of the information transfer not only occurring from within an organization but with other partners in the network. For partnerships to grow, it must develop shared organizing conventions and hold a shared platform by which to conduct several different units with varied functions and information to create knowledge and value to the alliance.

As mentioned, new knowledge does not occur separately from the current abilities of the alliance. Rather, new learning, such as service innovations, is as a result of an organization's or network of combinative capabilities to generate new applications from

existing knowledge. Schumpeter (1934) argued that, in general, innovations are new combinations of existing knowledge and incremental learning.

> "*To produce other things or the same things by a different method, means to combine these materials and forces differently... development in this sense is then defined by the carrying out of new combinations* (Schumpeter, 1934)

If we expand on Schumpeter (1934) theory and the thinking around the Sandholtz (2012) study, this would lead to suggesting that by 'coupling' (or combining capabilities) the capabilities of the organization internally and also externally, can lead to the exploitation not only their own internal knowledge and know-how but that of others in the value chain thereby entering into the unexplored potential of new supply chain service innovations. The decision on which capabilities to maintain and develop is influenced by the current knowledge of the organization and the expectation of the economic gain from exploring the opportunities in new technologies and organizing principles as platforms into future market developments. Taking a Schumpeterian approach, this means that organizations maintain those capabilities in-house and if necessary, search for capabilities externally that are expected to lead to re-combinations of economic value (Figure 2.2).

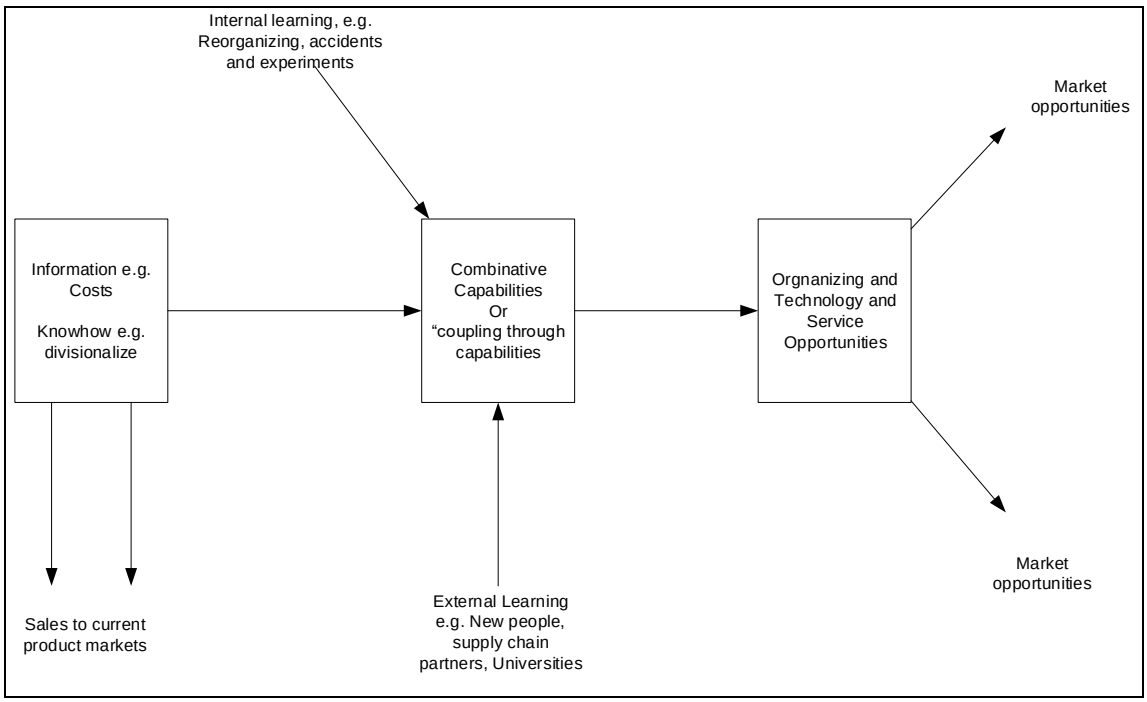

Figure 2.2: "Growth of the Knowledge of the Firm" Adopted from (Kogut & Zander, 1992)

The decision to acquire new capabilities internally and/or externally to the organization is dependent upon three elements: 1) How good an organization is currently at doing something 2) How good it is at learning specific capabilities and 3) The value of these capabilities as platforms into new markets (Kogut & Zander, 1992). For example, IBM was one of the first companies to recognize it was crucial to be able to specify and integrate a competitor's technology when customer demands it or when it provides a superior solution to an existing one. In innovative industries such as technology manufacturing competition there is frequently a question of the speed and efficiency by which diverse groups within an organization cooperates and delivers. A problem exacerbated when there is a lack of multi-functional coordination between supply chain partners that is required to deliver products and services to the market (Johnson & Gustafsson, 2003). Accumulated knowledge is of little

value if it results in products and service not being met by consumers' requirements of quality, responsiveness and flexibility (Bustinza et al., 2013).

Management need to make crucial decisions for long-term sustainability which often involves a complex tradeoff of decisions that relate to current profitability and investing in future capability (Gebauer et al., 2005). Critical is the balancing between short-term survival and the long-term development of capabilities. Stiglitz (1987) suggested strong reliance on current profitability can deflect from the wider development of capabilities (Kogut & Zander, 1992). Switching to new capabilities is difficult because if the knowledge embeddedness in current relationships and principles are not well understood, nor the social systems required to support new learning, then the chances of success are limited. It is the instability of these relationships and poor organizational support systems that generates the characteristics of inertia in an organization's capabilities (Kogut & Zander, 1992).

2.7 Servitization – Organizational Developmental Pathways

An organization facing fierce competition is likely to engage and search for innovative ways to improve performance. Entering into more formal relationships with supply chain partners comes with a growing understanding of the lifetime value of customers, and re-engineering processes, creates satisfied customers, repeat business, positive word of mouth and greater profits (Johnson & Gustafsson, 2003). Suppliers are increasingly being asked by the customer to bundle their products and services as customers no longer see the value in doing them inhouse (Hayes et al., 2004). The first step is to understand the management processes of the supplier-customer organization. The organizational arrangements around how the relationship is managed was seen as the first link for value creation and development

of competitive advantage (Quayle, 2003). Value creation relationships have led companies to develop a more integrative approach as they consider themselves partners in providing value to the customers (Wise & Baumgartner, 1999). In particular,

> *"Service quality-based business processes can help strengthen business relationships, develop synchronized linkages between supply chain members and consequently gain competitive advantage"*(Prakash, 2011).

A service-driven approach can progress to an intimate level where supply chain partners proactively seek information on each other's performance and use it to be more responsive (Kane, 2008). Findings from Khan et al (2006) study of 117 individual supply chain management personnel from small and large firms from the Council of Logistics Management found that:

> " *affinity-based collaboration led to a higher level of operational supply chain performance than one that is more transactional-based*" (Kahn et al., 2006).

Affinity-based demand collaboration representing the relational aspects, being the primary link between partners and not just transaction based (e.g. receiving an invoice).

Further evidence of relational based collaboration, Oliva and Kallenberg (2003) study of 11 capital equipment manufacturers, who were developing service offerings, found that the observed commonalities were not in the specific service provided, but in the nature of the service relationships and also illustrated this in their developmental sequence shown in Figure 2.3.

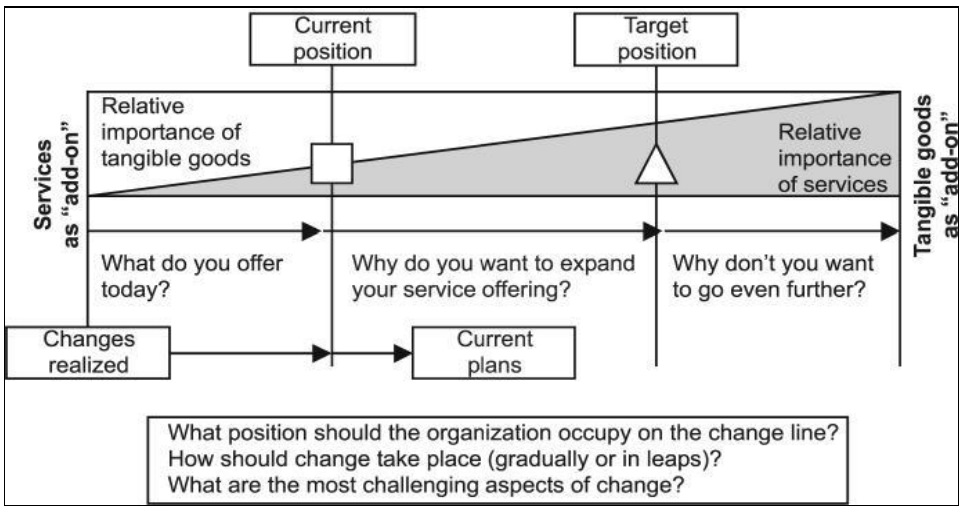

Figure 2.3: Product/Service continuum - source (Oliva & Kallenberg, 2003)

In keeping with Khan (2006) study, they also demonstrated the first step in the product/service continuum, the focus of customer interactions change from transactional to relationship based. Moving from a product centric orientation to becoming a service solution provider changes the way the service is priced, from a mark-up for labour and parts to a service that is provided giving a fixed price to cover all services over an agreed period. This form of type of contracting is when the service provider assumes the risk of product failure. Maintenance contracts are priced in terms of operational availability (performance based) and response time in case of failure. At this juncture the customer wants to make better use of the service provider. For the service provider, the service becomes a fixed cost and the main driver is capacity utilisation. Established service contracts reduce the variability and unpredictability of the demand over the installed capacity and allow a higher average capacity utilisation (Oliva & Kallenberg, 2003).

At this level of intimacy, it is difficult for competitors to intercede in supplier-customer organization relations. The ability to leverage higher supplier service quality becomes a core

competence of the focal organization. In order to strengthen the partnership with the supplier, focal organizations need to achieve integration not only across functions but also with its suppliers and customers. This integration requires internal streamlining of processes and adjustment of behavioural issues. Products, information, and explicit and implicit intangibles such as specialised skills sets, know-how are exchanged (Prakash, 2011).

As mentioned, to support service innovation, an effective resource system consisting of management principles and processes that empower and encourage service orientated values, interaction and responsiveness is needed. It is mentioned in a number of studies focusing on the process in which industrialised goods manufacturer transitions to a provider of industrial services in that the research in this field is very limited (Brady et al., 2006; Ettlie & Rosenthal, 2012; Gustafsson et al., 2005; Oliva & Kallenberg, 2003; Vandermerwe & Rada, 1989). The literature on solutions is growing and more needs to be understood around the nature of the transformation process from stand-alone products to solutions (Gustafsson et al., 2005).

Researchers suggest that manufacturing firms need to plan the introduction of a service innovation through a deliberate developmental process with some researchers suggesting the transition occurs in stages and is disruptive and that a new service unit is be needed (Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003). As a reaction to competition, successful companies will evolve over time from competing on product value, to competing on service value, to competing on solution value (Johnson & Gustafsson, 2003). During this stage, the manufacturer adds services to its total offering and as the service offerings accumulate, an organizational shift is experienced. However, there is debate over how this servitization pathway is developed and whether or not the transition occurs in stages (as Oliva and Kallenberg suggest) or whether it should be in large and sudden changes in a more revolutionary approach (Gustafsson et al., 2005).

Oliva and Kallenberg (2003) study of 11 equipment manufacturers' supports Johnson and Gustafsson's (2003) theory that transition should be a staged progression and developed a theoretical model (Figure 2.3) showing the transformational patterns followed by organizations that had attempted transition to services often initially seen as an 'add-on' (competing on product value) to eventually products being seen as the 'add-on' (competing on solution value). The cases in their study were specifically chosen according to their perceived position along the product-service continuum. They concluded that the transition is disrupted when a new set of issues trigger a strategic response e.g. downturn in product sales or customer complaints (Figure 2.4). During each stage the organization focuses on a set of issues which act as a trigger for change and addresses them through the development of new capabilities shown in Figure 2.4 (Oliva & Kallenberg, 2003).

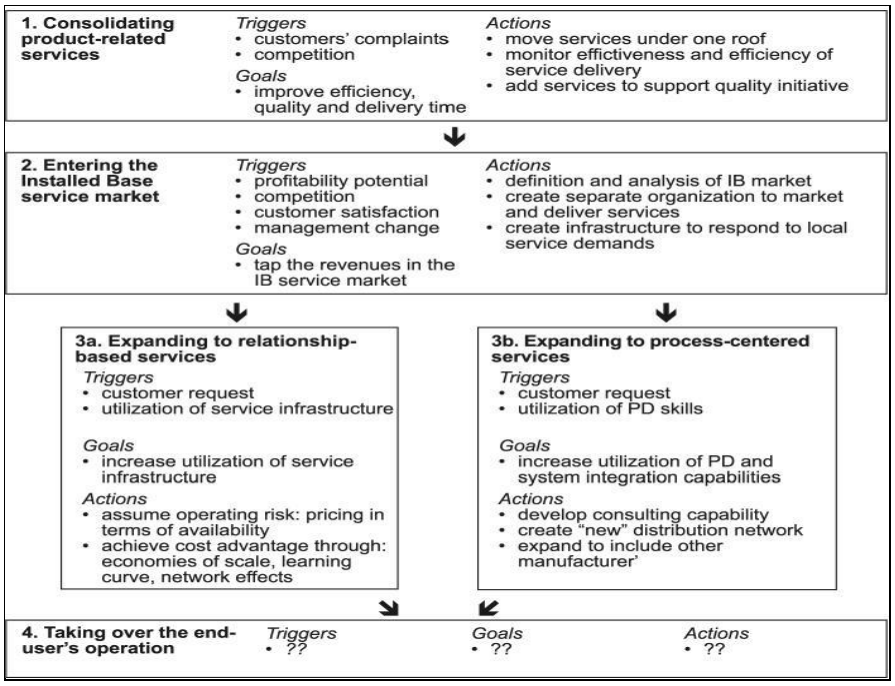

Figure 2.4: Process model for developing installed base service capabilities

Source: (Oliva and Kallenberg 2003)

The first stage of transition requires the consolidation of product related services under a single organizational unit offering. Oliva & Kallenberg (2003) surmise that organization response is usually triggered by customer complaints and/or competition. This tends to be an unprofitable, fragmented process growing out of different parts of the organization. Initially the goal is to improve efficiency, quality and delivery time which is closely associated with the transactional-based strategy. The transition occurs by moving services under one roof with products. The manufacturing organization monitors effectiveness and efficiency of service delivery and then adds services to support their quality initiative (Oliva & Kallenberg, 2003). They achieve this by embedding services using software to integrate downstream services such as maintenance or fault reporting in the physical product (Wise & Baumgartner, 1999).

At this point the trigger for change is identifying a profit opportunity within the service arena and sets up the structures to support it. The profit realisation is as a result of having monitored and measured from the first stage of transition. Oliva and Kallenberg (2003) recognized the challenges that a product-centred organization must go through to become service orientated requiring a culture change. They found the critical success factor to this stage of the transition is the creation of a separate unit and service innovation strategy to handle the service offering. The unit has a dedicated sales force, their own service technicians and an information system to monitor the business operations and to achieve accounting transparency for the new business (Oliva & Kallenberg, 2003). Also, Ettlie and Rosenberg (2012) recognized that corporate culture is the driving force behind transition however they do not go as far as stating that an organization needs to create a separate unit that is recommended by Oliva and Kallenberg (2003). Both agree that a service innovation strategic plan was needed which involves a leadership group nurturing both the new innovative idea and a process to sustain this development. Researchers suggest that the new unit protects the

emerging service culture with its metrics, control systems, and incentives (Oliva & Kallenberg, 2003). Externally the organization is establishing itself organizationally in the basic Installed Base (IB) service business before moving to the next stage.

Once the core functionality of the unit has been set, the focus changes to one of customer interactions from transactional to relationship-based (Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003). The provision of products and services come together as integrated solutions that address a customer needs (Wise & Baumgartner, 1999). For example, the way in which the service is priced changes from a mark-up to a fixed price covering all services over an agreed period. The effect of this form of contracting is that the service provider assumes the risk of equipment failure. Once the service unit is set up it becomes a fixed cost and the main driver of profitability is capacity utilisation. At this point the organization investigates providing an outsource service to the customer where the pricing can be done on the basis of equipment availability and not based on the providers cost of monitoring the equipment and performing scheduled maintenance and emergency repairs (Hayes et al., 2004; Oliva & Kallenberg, 2003). Externally this step requires marketing effort and time, the organization needs to establish a formal arrangement such as a strategic alliance to set up an ongoing relationship with the customer. The service provider's product is becoming part of the offering as opposed to being centre to it (Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003). Centring on the customers process is equivalent to shifting the emphasis of the business from manufacturing a product to becoming a solution provider as shown in Figure 2.3. Oliva and Kallenberg (2003) suggest from a capability perspective, an organization should only take this step after its service organization has established itself organizationally in the maintenance and professional services market (Oliva & Kallenberg, 2003).

Ettlie and Rosenthal (2012) make a persuasive case for the pivotal role of corporate culture as the preliminary powerful force in initiation and implementation of a service innovation, as do Oliva and Kallenberg (2003). They both identified that the transition into services as disruptive (Ettlie & Rosenthal, 2012; Oliva & Kallenberg, 2003) and that an organization needed a separate innovation strategy (Ettlie & Rosenthal, 2012). Although Ettlie and Rosenthal (2012) don't go as far as Oliva and Kallenberg (2003) in concluding that the organization needs to set up a separate entity, instead they insist that a few critical functions are elevated to a strategic level of leadership.

In their study of nine manufacturing organizations their findings conclude that the emergent strategy sponsorship was led by the Chief Executive Officer (CEO) because that individual personally drives company strategy and has a strategic view of the importance of the service innovation. They found the service innovation is closely linked with the traditional manufacturing mission of the organization in that the consolidation of the service offering is normally accompanied by a strong initiative to improve the efficiency, quality and delivery time of the services provided (Ettlie & Rosenthal, 2012; Oliva & Kallenberg, 2003). The champions who implement the change tend to be a well-established member of that organization (Oliva & Kallenberg, 2003). The elevation of a few critical functions to a strategic level of leadership precedes the execution of the innovation (Ettlie & Rosenthal, 2012). Innovation and planning are led by an ad hoc multi-functional group which are a coordinated set of individuals who work together to refine the service concept and formalise a long-term, broad-scope plan. In their study, they found that this strategy worked well depending upon the development culture and available resources (Ettlie & Rosenthal, 2012). The study concluded that if manufacturing organizations understand and leverage their corporate culture context of the innovation process, no matter what their approach or pathway

to transition, the way they approached service development informs all new service venture creation (Ettlie & Rosenthal, 2012).

The organization's move into service solutions (where tangible goods are seen as an "add-on" to services) includes taking over an end-user's maintenance or operating organization, a largely uncharted territory for manufacturers in most industries (Oliva & Kallenberg, 2003). In Oliva and Kallenberg's 2003 study, none of the 11 equipment manufacturers had yet moved into this space. As previously mentioned collaboration mechanisms between suppliers and customers is essential theme in integrating the supply chain network (Kahn et al., 2006). Most traditional manufacturing organizations find integration challenging as they are vertically integrated and limit their span of control to their immediate customer (Bustinza et al., 2013). Traditionally link channels refer exclusively to link channels in a vertical supply chain; however customer linking is a boundary spanning activity and this link to customers is essential in improving relationships (Wong, Skipworth, Godsell, & Achimugu, 2012). As organizations have moved to providing customers with a more integrated experience value, it may become clear that any one organization simply does not have all the capabilities and intellectual capital to do it all (Johnson & Gustafsson, 2003).

Firstly, in the move to be profitable the manufacturer must first determine the attractiveness in the downstream market.

> *"Indicators like the ratio of a product's installed base to annual new-unit sales, the customer's usage costs over the product life cycle relative to the products price, and the profitability of downstream activities relative to product margins will provide a sense of the size of the downstream profit opportunity"* (Wise & Baumgartner, 1999).

The manufacturing organization structure must align with their supply chain partners not just to create value but to capture value from their customers. "Whereas product innovation uses customer information as input to an internal process, service innovation should integrate customers directly into the process"(Johnson & Gustafsson, 2003). "By effective outsourcing with their supply chain partners, organizations can concentrate on their core systems integration activities, while building up their capabilities in operation services to offer entire solutions to a customer's needs" (Davies, 2004). For example, when General Electric (GE) developed its jet engine maintenance service, customers were already performing maintenance functions on their own or within a network of services providers. GE simply took ownership over the total service process (Johnson & Gustafsson, 2003).

Supply chain integration requires system coordination and to be moved to a strategic level in the organization. Providing partnered solutions requires quick and efficient information exchange. Information exchange occurs by bringing later and earlier step components of the supply chain into a whole and ensuring that those components function together. Integration occurs in a series of dynamic feedback loops, rather than a simple linear step by step process, adding value between later and earlier stages in the value stream (Oliva & Kallenberg, 2003). As previously mentioned, the use of technology has been a powerful tool in enabling integration. It allows the quick and efficient exchange of certain types of information that are vital for coordinating operations. Within these structures, a system integrator manages the delivery of operational services by a network of partners including manufacturers, maintenance and logistic specialists and professional organizations (Oliva & Kallenberg, 2003).

As an organization succeeds by learning to provide integrated solutions that address customer-needs it develops a close bonding relationship with the fellow suppliers and customers (Oliva & Kallenberg, 2003). This relationship is enhanced by proximity to the

customer which allows the solutions provider to anticipate needs and work jointly in projects to develop and configure new technology, products and services to a customer's needs (Oliva & Kallenberg, 2003).

2.8 The importance of Information Technology for Knowledge Transfer

Information Technology (IT) has become one of the most important parts of a organizations' infrastructure in providing a platform for an integrated solutions to their customers (Johnson & Gustafsson, 2003). Gao and Rubalcaba (2007) recognized for services that "information and communication technologies (ICTs) offer possibilities for increased client-provider interaction and capture of customer's needs" (Gago & Rubalcaba, 2007). Bustinza describes the importance of technology in servitization for the servitizing firm that "a rapid uptake of technology is necessary for a shift in power away from the suppliers towards the customer becomes critical" (Bustinza et al., 2013). It provides a platform for customers, but also the integration of all players including suppliers and the servitizing firm.

In the past, IT in the manufacturing context, has been discussed as the development of a system to assess the effectiveness and efficiency of the delivery of products. Oliva & Kallengberg (2003) early on in the discussion of its potential platform for servitization, mentioned that initially "the IT system allows managers, to realise the size of the service market and account for services' contribution to the organizations operations" (Oliva & Kallenberg, 2003). The ability to measure the profitability potential and benchmarking competition allows the organization to make decisions about progressing further along the product/service continuum into the service provider arena (Oliva & Kallenberg, 2003). Oliva and Kallenberg (2003) went on to explain that externally, benchmarking and monitoring service quality a hybrid of service quality and performance metrics (e.g. number of orders

delivered on time), can be used for measuring performance based on the behavior of suppliers involved in the determination of the effects of operational activities such as procurement, delivery, inventory management and manufacturing on perceptual factors such as supplier satisfaction.

As Coreynen et al., (2017) state that "not enough is known at this point about how manufacturers can effectively leverage digital means to increase their service offering" (Coreynen et al., 2017). Their study looked at how digitization enables manufacturing companies to offer a higher level of value-added services to their customers. They concluded that that "distinct servitization pathways led to integrating with customer's processes thus increasing its competitive advantage over other providers"(Coreynen et al., 2017). In their four case studies, they proposed a framework that presented three distinct pathways for manufacturers who wanted to increase their service offerings through digitization. Their findings revealed that in the instance of industrial and commercial servitization (first and second pathway) enable services that support customers completing tasks on their own, such as advice, training, consulting and online self-service management tools. By combining pathways into one integrated offering, companies may gradually take over certain activities traditionally performed by the customer. Value servitization (third pathway) enables companies to unburden the customer for certain activities. This pathway requires a more radical change in the provider-customer relationships by introducing new digital products that change customer processes and allow the provider to gather data, learning from the client. "When companies reach the point in integrating and customizing they are in a position to provide the customer with a solution" (Coreynen et al., 2017). This seems to back the notion of Kogut and Zander's discussion on organizational learning and transfer of knowledge in that:

"The central competitive dimension of what organizations know, is how to create and transfer knowledge efficiently within an organizational context" (Kogut & Zander, 1992).

In other words, the knowledge of an organization can be considered an ownership of a portfolio of options, or pathways to future developments and profit. Digitalization of knowledge through IT platforms, enable the organization to learn more quickly from their customers and supply chain partners and increases the number of servitization pathways in which to deliver those services.

2.9 Servitization Risks and 'The Service Paradox'

Various researchers reflect on the way in which different servitization transitions can evolve and highlight the risks involved in the servitization process (Ettlie & Rosenthal, 2012; Gebauer et al., 2005; Gustafsson et al., 2005; Oliva & Kallenberg, 2003). Gustafsson et al (2005) says that:

"management viewing services as an add-on is an inadequate strategy in order to provide high quality offerings. They imply that a cautious more steady approach to change is seen as safer and less risky" (Gustafsson et al., 2005).

However, a steady approach could be more risky than the add-on approach which suggests that incremental changes to the system does not change the system structures that have evolved to support the manufacturing business (Gustafsson et al., 2005). It is this perception that services are "add-ons" (Gebauer et al., 2005; Gustafsson et al., 2005) and usually "given away for free and easily imitated by competitors" contributes to the attitudes of employees

that's services are not what they are in business for but that of product manufacture. Gebauer et al (2005) observed that extending the service business in manufacturing companies often leads to a "service paradox" (Gebauer et al., 2005). The service paradox meaning:

> *"when firms invest substantial investment in extending the service business leads to increased services offerings and higher costs but does not generate the expected correspondingly higher returns"*(Gebauer et al., 2005).

They observed that most manufacturing companies find it difficult to exploit successfully the financial potential of an extended service business due to an organizational and behavioural dimension that management have not considered. Managers are often unprepared to deal with the various nuances of servitization and have difficulty in overcoming "cognitive phenomenon" or initial impressions around adding services to products owed to an over emphasis on tangible environmental characteristics around products (Gebauer et al., 2005). Gebauer et al (2005) recommends a number of changes in the organizational structure needs to occur such as establishing a market orientated and clearly defined service development process and creating a service culture within the organization.

> *"By setting of appropriate goals to boost the "employee-pull" effect, that capacity expansion overcomes the resource bottleneck and that employees favour second-order improvements"*(Gebauer et al., 2005).

The employee-pull effect happens when perceptions around the implementation of service innovation progress is high relative to goals set by management. The dependence of employee perception on observed progress means that objectives of the service innovation are seen as successful and this will assist in developing the service business (Gebauer et al., 2005)

Sandholtz 2012 study about coupling or decoupled compliance, suggests problems can arise in how employees are asked to enforce change. If management forces the organization to adopt new change from a top-down approach, rather than endorsing it and empowering

employees, it is unlikely that the employee teams want to be the "agents of change" because they are viewed by management as the "objects of change" (Sandholtz, 2012). DiMaggio and Powel (1983) study on institutional isomorphism and collective rationality state that management need to recognize what occupational collectives (teams) and their routines make up their organizations (DiMaggio & Powell, 1983). Their study concluded that:

> *"if teams work in silos then the inherent challenges include business units competing not just for resources and customers, but for political power and for social as well as economic fitness"* (DiMaggio & Powell, 1983).

DiMaggio and Powell (1983) suggest that highly structured organisations internally often deal with uncertainty and constraint by staying totally homogeneity in structure culture and output to maintain efficiency. Service innovation as a learning environment, requires organizations to be responsive and flexible in structure, culture and output in order to adapt to change. Management should motivate groups of employees to work together to integrate new service capabilities and provide a platform that enables them to make timely decisions.

Johnson et al (2003) suggest that when firms have chosen and decide to collaborate with external organizations then another phenomenon "multifunctional coordination" can occur. This is when firms are fragmented and unorganized if not planned and systems have not been set up (Johnson & Gustafsson, 2003). To overcome this is to create an integrated solutions platform. A system that creates a seamless operation which allows initiatives to flow across traditional silos promoting the spread of ideas for continuous improvement. This encourages customer in letting the firm take over critical operations. This can be daunting in that the customer needs to share their intimate business information and problems with their providers that may have also been their source of competitive advantage. There is always a fear that the provider may become a competitor (Penrose, 1959). Conversely providers face the risk that the customer integrates backwards along the supply chain. Customer participation gives the

customer an insight into provider processes (Giannakis, 2011). However, firms may overcome any uncertainty:

> *"by providing high quality products or services and either selling at a price that makes it unprofitable for the customer to perform the activities inhouse or show that services provided by the supplier adds more value to the customer's end product than had they performed the service inhouse"* (Oliva & Kallenberg, 2003).

Management need to encourage ownership internally from the bottom-up, as mentioned in Gebauer et al (2005) study, describing the employee-pull effect and use collaborative mechanisms such as cross functional teams to promote and share knowledge and build capability across organizations creating integrated sharing platforms.

2.10 Research Gap

Recent literature on servitization suggests that questions still remain unanswered in terms of the process of servitization transformation (Baines et al , 2017; Baines, 2019 et al). Especially, leveraging existing capabilities and developing new ones is an important aspect of servitization transformation (Kanninen et al., 2017). In the environments that are globally competitive, fast-moving and geographically dispersed, "to achieve sustainable competitive advantage requires more than just difficult to replicate assets, it also requires difficult to replicate dynamic capabilities" (Teece, 2007). Organizations with strong dynamic capabilities shape their own business ecosystems through collaboration with other enterprises such as customers and supply chain partners and are more likely to sustain their performance over time (Augier & Teece, 2009; Bustinza, Parry, & Vendrell-Herrero, 2013; Ettlie & Rosenthal,

2012; Kogut & Zander, 1992; Teece, 2007). In the realm of servitization, researchers advocate that there is to be further understanding of the transformation of dynamic capabilities especially in the context of a smaller manufacturer (Kowalkowski, Gebauer, & Oliva, 2017) and with a longitudinal approach to understand the developmental approach of firms' capabilities (Kindström, Kowalkowski, & Sandberg, 2013; Oliva & Kallenberg, 2003).

The transition from a manufacturer to a service provider often means a radical revamp of firm's operations both internally and through extended supply chains, revamping of financing, ownership structures or human resource policies to name but a few (Baines et al., 2017, 2019). Successful servitization could be beneficial to a firm yet at the same time, servitization presents a significant risk to firms. For instance, firms might find it difficult to resource the servitization transformation and end in bankruptcy (Benedettini, Neely, & Swink, 2015). Firms survival during the servitization transformation is therefore under increasing pressure and this is in particular important in the context of a smaller manufacturing firm – who often have scarce resources. This study investigates how firms manage servitization transition. The study is grounded in dynamic capability perspective (Teece, 1997) and focuses specifically on understanding the mechanisms through which firms ensure the development of servitization capabilities that ultimately become dynamic capabilities (hard to imitate and create value). Following the suggestions of Baines et al. (2017, 2019), we investigate the transition through the lenses of 'content', 'context' and 'process' – as Baines et al. (2017) suggest "focusing on the organization, the framework can be used to understand why change occurs (through analysis of outer and inner contexts), how changes take place (through analysis of processes) and subsequent effects on people, processes and organizations (through analysis of content)" (Baines et al., 2017). Focusing on the development of a richer understanding of the process and content at each stage of the transformation, Baines et al. (2019), stated that it would be valuable to understand the variety, popularity and sequencing

of process and content within each stage. Also, that it would be "valuable to know the relationship between these and the forces impacting progression" and to "investigate the linkages between context and process" (Baines et al, 2019). Therefore, in this study we look at the development of capabilities during the servitization transformation pathway particularly in regard to their context and progress, linkages and sequencing of each firm's journey.

2.11 Theoretical Framework

In order to study the servitization transformation of the manufacturers the following research framework has been formulated through the theoretical lens of Dynamic Capabilities. Teece et al. (1997) describes dynamic capabilities as the "ability of firms to modify and reconfigure resources, evolve with changing environmental conditions and sustain a competitive advantage" (Teece et al., 1997). Capabilities are evolving over time, in no set order but the success of the transformation comes down to organizations "excellent asset orchestration" in order to preserve the existing business alongside the developing new business (Teece, 2018).

The design of the research questions was based on the literature review conducted. Table 2.1 outlines how the questions were constructed by looking at different phases outlined from literature about the transition. Firstly, the motivation behind the move into services. Secondly, the transition itself, how it occurred and what capabilities were needed and thirdly, what challenges were experienced along the way. This would help identify also how they came to overcome such challenges and lead to a conversation on how successful they were in response to those challenges.

Table 2.1: Theoretical Framework for the Research

Rationale	Areas of interest	References
Motivation behind integration of products and services		
	Sustain and enhance value of an organization, higher margins, high value integrated solutions, competitive advantage, increased market share, Resource based view of the firm.	(Barney, 1991; W. P. Barnett & Hansen, 1996; Brady et al., 2006; Davies, 2004; Ettlie & Rosenthal, 2012; He et al., 2014; Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003; Penrose, 1959; Prakash, 2011; Sawhney et al., 2004; Spohrer & Maglio, 2008; Wise & Baumgartner, 1999).
	Strong market forces in high volume manufacturing, stagnating product demand in Asia	(Davies, 2004; Wise & Baumgartner, 1999)
	Rapidly changing environments particularly in technology sectors;	(Augier & Teece, 2009; W. P. Barnett & Hansen, 1996; Bustinza et al., 2013; Teece, 2007; Teece et al., 1997)
	Uncertainty of environment; best practice	(DiMaggio & Powell, 1983)
Servitization Transition		
	Service Business Model Innovation	(Amit & Zott, 2012; Oliva & Kallenberg, 2003; Teece, 2010, 2018; Visnjic, Wiengarten, & Neely, 2016)
	Vertical and horizontal networks. Changing to focus on needs of customers.	(Hayes et al., 2004; Oliva & Kallenberg, 2003; Wong et al., 2012)
	Servitization Pathways	(Brady et al., 2006; Ettlie & Rosenthal, 2012; Gustafsson et al., 2005; Johnson & Gustafsson, 2003; Neely, 2008; Oliva & Kallenberg, 2003; Wong et al., 2012)
	Transforming and exploiting existing organizational knowledge. Ecology of competition and learning	(W. P. Barnett & Hansen, 1996; Barney, 1991; He et al., 2014; Kogut & Zander, 1992; Sandholtz, 2012; Schumpeter, 1934)
	Collaborating with Supply Chain Partners, how relationship is managed, synchronized linkages	(Hayes et al., 2004; Johnson & Gustafsson, 2003; Kahn et al., 2006; Oliva & Kallenberg, 2003; Prakash,

Rationale	Areas of interest	References
		2011; Quayle, 2003; Wise & Baumgartner, 1999; Wong et al., 2012)
	Service Quality, flexibility and responsiveness	(Bustinza et al., 2013; Lee, 2004; Prakash, 2011; Roth & Van Der Velde, 1991)
	Information Technology platforms, Transfer of knowledge, Service integration	(Bustinza et al., 2013; Coreynen et al., 2017; Gago & Rubalcaba, 2007; Johnson & Gustafsson, 2003; Kowalkowski et al., 2017; Oliva & Kallenberg, 2003)
	Dynamic Capabilities; Combining existing and new capabilities/resources internally and externally to organization	(Augier & Teece, 2009; Bustinza et al., 2013; Coreynen et al., 2017; Ettlie & Rosenthal, 2012; Kahn et al., 2006; Kanninen et al., 2017; Kindström et al., 2013; Prakash, 2011; Raddats et al., 2017; Schumpeter, 1934; Teece, 2007, 2010, 2018; Teece et al., 1997)
	Who leads the transformation? CEO sponsorship; cross functional teams	(Ettlie & Rosenthal, 2012; Oliva & Kallenberg, 2003; Sandholtz, 2012)
Challenges to Servitization		
Transforming from a culture of design and delivery of complex products to understanding and focussing on customer related services	Service Paradox; Disruptive change; cultural change; Product and Services - Disjoint set of operations, strong profit reliance can deflect development of capabilities; Lack of employee pull effect	(Brax, 2005; Bustinza et al., 2013; Ettlie & Rosenthal, 2012; Gebauer et al., 2005; Gustafsson et al., 2005; Johnson & Gustafsson, 2003; Kogut & Zander, 1992; Oliva & Kallenberg, 2003; Prakash, 2011; Teece, 2010)
	Services - entry barriers are lower to competitors; services do not enjoy economies of scale like products, management focus	(Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003)
	Fear of supplier becoming competitor	(Oliva & Kallenberg, 2003; Penrose, 1959)
	Management enforce a top down approach rather than empowering employees	(He et al., 2014; Sandholtz, 2012)
	Different norms, routines, languages of products and services	(Kogut & Zander, 1992)

Rationale	Areas of interest	References
	Homogeneity of organizations; Inertia to innovation	(DiMaggio & Powell, 1983)
	Multifunctional coordination – fragmentation	(Johnson & Gustafsson, 2003)

It is worth mentioning that the early identification of the research question and possible constructs is helpful but it is equally important to recognise that both are tentative in this type of research so that it allows the research to be flexible and agile with forthcoming information (Eisenhardt, 1989). This approach encourages open mindedness and assists in limiting bias and therefore prevents influencing the findings (Yin, 2014). The research questions devised for data collection reflect this approach. The question are open-ended so that free flowing discussion can take place as this is where the important information resides. The overview of the questions are presented in Table 2.2.

Table 2.2: Question development from areas of interest

Areas of Interest	**Research Questions**
Motivation behind Servitizing: Enhance and sustain value; higher margins competitive advantage, customer demands, strong market forces from high volume manufacture; stagnating product demand; market uncertainty; government initiatives; best practice	Why did your company decide to add services to your product offering? What type of services do you offer? How did you know what type of services to offer?
Servitization Transition; Transformation: Service Business Model innovation; recognising key competences (RBV) changing to focus on needs of customers; vertical and horizontal networks; servitization pathways; transforming and exploiting existing organizational knowledge, combining capabilities (Dynamic Capabilities); ecology of competition and learning (Red Queen); service quality, flexibility and responsiveness; use of technology; service integration; supply chain partnerships and alliances; CEO sponsorship; leadership; cross functional teams, company structure.	How did the company transition to including services into the business? How was the company set up structurally to deliver services? What changes did you make to your original strategic objectives? How would you describe your product/service offering? (Figure 2.3 - product service continuum) Who sponsored and led the service innovation from beginning to end? How did you monitor and measure the service innovation progress?

	How have you used technology to assist in providing services? What types of strategic partnerships do you have to assist in delivery of the services? How are these strategic relationships managed? How is information transferred between strategic partners? Are there any plans in the future to extend services, bring in new service innovations? If so, then what are they likely to be?
Organizational Challenges; Risks; Service Paradox: Disruptive change; cultural change; product and services: disjoint operations; employee pull effect; resource capacity requirements; strong profit reliance deflects development of capabilities.	What challenges have you encountered in incorporating services into your business? How have you overcome these challenges?

Chapter 3: Research Methodology

3.1 Research Approach

To manage the increasing number of changes in product/service development, technology and managerial methods in organizations, researchers have been calling for a greater employment of qualitative, field-based research methods, one being case-based research so that it may be observed and analysed from real life examples (Voss, Tsikriktsis, & Frohlich, 2002). In a highly competitive product market, firms look to the process of servitization to differentiate themselves from their rivals to increase revenue and remain competitive. The process requires firms to update their business models to include service-based capabilities, at the same time, maintaining business as usual. In this study, the use of case-based research allows for the examination of how firms transition in a practical setting where observations can be studied to understand the transformation in situ. The research approach is detailed in Figure 3.1.

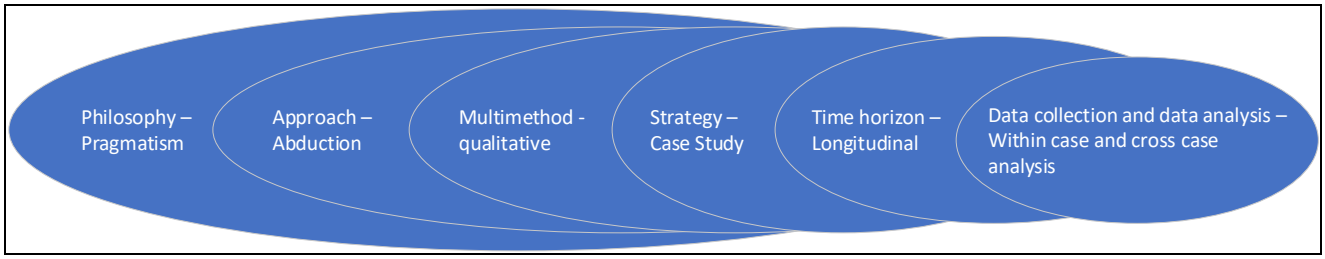

Figure 3.1: Research Approach

The research approach has its roots in pragmatist philosophy, which was first developed by early American pragmatists: Peirce, Dewey and James in the late 19th and 20th centuries who hold that both the meaning and truth of any idea is a function of a practical outcome and that all principles be regarded as a working hypothesis that must bear fruit in lived experience.

Pragmatists look to a combination of methods necessary to find answers to research questions. Abductive reasoning is a form of logical inference, which starts with an observation or set of observations then seeks to find the simplest and most likely explanation for the observations. This approach is an alternative to the inductive and deductive approaches which both strive to construct a valid argument. Inductive reasoning moves from specific instances into a generalized conclusion, while deductive reasoning moves from generalized principles that are known to be true to a true and specific conclusion. In this study, the researcher revisits and finetunes the collected data through multiple qualitative methods such as using Logic Model "cause and effect" methods (Miles & Huberman, 1994) detailed in Appendix 5 and 6 with an analysis of the challenges that occurred throughout is shown in the case dynamics matrixes (see Appendix 4). This use of qualitative strategies of collecting data through case study research provides the ability to generate and build theory to assist in the understanding of complex phenomenon (Eisenhardt, 1989). For robust case study design this study builds on Yin (1994) and Eisenhardt (1989) who has bought together previous literature on building theory from case research and (Voss et al 2002) who provides a useful roadmap.

Case based research is used to gain an understanding of underlying reasons, opinions, and motivations for why and how conditions occur. A case study is a history of past and current phenomenon drawn from multiple sources of evidence (Yin, 1994). It can include data from direct observation such as focus groups (group discussions), individual interviews, and participation/observations as well as public and private archives (Leonard-Barton, 1990). These different sources of data is known as triangulation, where the validation of the data can be increased further during which there is a continuous comparison of data and theory.

Alternative to this approach would be a quantitative type of research, which intention is to be used to quantify the problem by way of generating numerical data or data that can be transformed into usable statistics and usually generalizes results from a larger sample

population. Quantitative data collection methods are much more structured than qualitative data collection methods, it is not considered for this study due to the nature of the research question which aims to provide in-depth and longitudinal insights about servitization transformation.

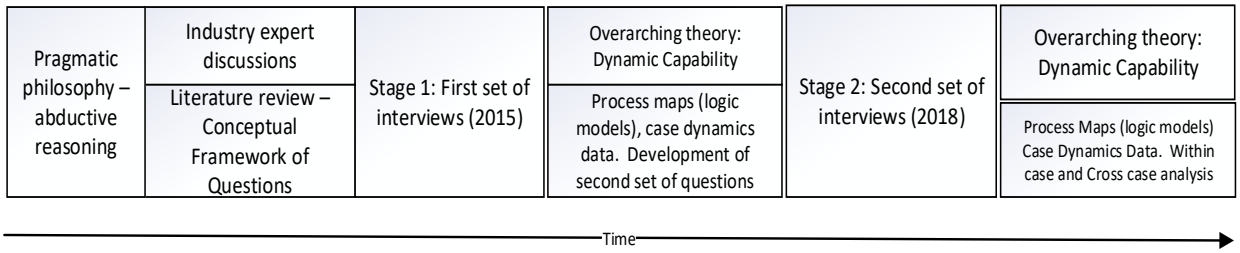

Figure 3.2: Research Timeline

In summary, the overview of the research approach over time is provided in Figure 3.2. The theoretical underpinnings of this study are detailed in Table 2.1 and shown in the research timeline in Figure 3.2. An initial literature review has served to develop conceptual framework of questions in Table 2.2. The framework builds upon existing theories and to explore and better understand of emerging, contemporary issues in their pragmatic world settings (Eisenhardt, 1989). The qualitative case study approach allows for the ability to explore a more abductive reasoning of the rationale and subsequent journey that companies have undertaken. As mentioned, the abductive approach allows for a broader understanding of what has happened beyond simple interactions that would only be obtained from deductive survey approach. The cases can be studied in their natural settings and meaningful relevant theory generated from the understanding gain through observing actual practice (Eisenhardt, 1989; Miles & Huberman, 1994; Yin, 1994).

3.2 Selection of Case Study Organisations and Data Collection

In order to unravel and consider the increasing complexity in today's organizations, researchers have been calling for a greater employment of qualitative, field-based and longitudinal approaches (Voss, Tsikriktsis, & Frohlich, 2002). This is also the case in the context of this study that addresses servitization transition – a complex and longitudinal process. For that reason, we have employed a longitudinal multi-case study approach (Yin, 1994; Eisenhardt, 1989) and investigated the transition in six case organizations between 2015 and 2018. Eisenhardt (1989) suggested four to ten cases as an adequate number for multiple case research. The limited number of cases is deliberate to allow for an in-depth analysis on each case (Eisenhardt, 1989; Voss et al., 2002) allowing for generation of reliable and generalizable theory – whilst keeping the data set manageable (Miles et al, 2014). As we have mentioned at the outset of the paper, the firms represented exemplar manufacturing firms in New Zealand – all of which have decided to enhance their products with services. We had initially negotiated access with more firms but not all participants felt comfortable sharing their experience. In each case study, our main informant was a CEO (or more senior managers). Initially, eight firms agreed to participate. It was found that two of the cases were predominantly competing on product consumables. They were already dominant in their markets and not looking to add services to their portfolios and were therefore dropped from the sample, now totalling six cases. The data collection occurred over a three-year period. We started by conducting informal interviews with industry experts to get an understanding of case study organizations and finalized the data collection protocol (see the list of open-ended questions in Table 2.2). The first group of industry experts were made up of 4 experienced Company Directors of manufacturing firms who recommended the various manufacturers that they knew were servitizing and were able to provide access to these firms. The New Zealand

Manufacturer's and Exporters Association President was also able to guide us in the direction of several member firms who were in the process of servitizing. The Canterbury Development Corporation whose core priorities are to grow jobs, improve the economic, social and environmental competitiveness of Christchurch businesses, assisted in providing access to several relevant businesses they had partnered with. By meeting with several different groups of industry experts at least once, provided recommendations as to which firms to consider for the study, making the researcher feel satisfied with the initial sample that they were suitable participants who were at various stages of servitization transition. Each of these interviews were conducted over at least 60 minutes.

Later, we followed with *Stage 1* of data collection (refer figure 3.2) – central to which was a site visit during which the initial data was collected (the data was collected interviews with senior managers, informal interviews with other managers and collection of data from documents and memos). In line with the abductive approach to research, active participants, preferably CEO's who had an intimate understanding in the process of transforming or changing their organization due to servitization, were engaged in the study. The CEO's and senior managers were chosen as they are at the level in the organization where strategic decision-making takes place, they are responsible for the vision of the company along with the setting of goals and formulation of transition plans.

Stage 2 of data collection (refer figure 3.2) was scheduled in years 2 and 3 of the study. In the meantime, we have been analyzing the data and verifying and collecting additional data from several Technology Investment Network (TIN) reports (TIN, 2016, 2018), governmental data, company documents such as annual reports, website blogs and media releases. These multiple sources of data were used to triangulate the findings (Eisenhardt, 1989). It was critical for the study to observe organizations in their current settings over longer period of time to understand how these organizations developed service capabilities and how they

transformed during the process of servitizing (Eisenhardt, 1989; Voss et al., 2002; Yin, 1994). A summarized version of the backgrounds and observations are provided in Appendix 3. The researcher has had experience in the field of industry as a management consultant and was familiar with the language, asking the right questions. It was imperative to build a relationship with the senior managers and them feeling comfortable to share their experiences. Most of the interviews took at least 60 minutes, if not longer in some case as conversation flowed between interviewer and interviewee.

As indicated by Eisenhardt (1989) triangulation gives validity to the data as in order to provide back up and confirmation of data, the industry experts, and other various sources were relied upon, such as several Technology Investment Network (TIN) reports (TIN, 2016, 2018) to clarify their sustainable prior to the servitization process, governmental data from think tanks as to why these companies should servitize , company documents such as annual reports that report on progress, website blogs and media releases that gave us information on the physical and human elements of the transformation. Table 3.1 provides a summarized description of each firm and also outlines of the sources of data that was used in this study.

Table 3.1: Case Study Organizations

Initial Characteristic	Case A	Case B	Case C	Case D	Case E	Case F
Market Profile by Secondary market	Communications Solutions	Healthcare	Operational Support	Appliances	Heavy Manufacturing	Agricultural Tech
Servitization Pathway Description**	Product and Service orientated PSS	Product orientated PSS	Product and Service orientated PSS	Integration, Product, Service orientated PSS	Integration and Product orientated PSS	Product and Service orientated PSS
Type of services	Design, software programming, call centre, maintenance, consulting	Design, quality assurance, regulatory signoff	Design, software programming, software training maintenance	Design, financial services, maintenance services, asset management (fleet management)	Design, maintenance, procurement, consulting	Design, software programming, call centre, maintenance, consulting
Founded	1962	1992	1987	1942	2001	1964
Founding Team	Single entrepreneur	Two entrepreneurs	Single entrepreneur	Family Entrepreneurial	Team of seasoned executives	Team of seasoned executives
Size (no. of employees)	600	20	95	300	50	548
Initial Funding sources	Self-funded	Joint Venture US/100% NZ investor owned	Self-funded	Self-funded	Corporate VC	Corporate VC
Geographical markets	98% Overseas NZ	98% Overseas NZ	98% Overseas NZ	NZ and Australia	NZ	NZ and Global
Number of Interviews	7	4	4	5	4	4
Main Internal informants	Former CEO CEO	CEO	CEO	CEO/CFO	CEO/ Ex-Senior executive	CEO/Former CEO
Informal Interviews	Case A SCM NZMEA**** President External Director	CDC*** employee External Director	2 x External Directors	External CEO CDC Employee	External CEO CDC Employee	External CEO External Director
Archival data type	Industry Report Media Reports Website	Industry Report Media Reports Website	Industry Report Media Reports Website	Industry Report Strategic Plan on a Page Website	Industry Report Annual Reports Media Reports Website	Industry Report Media Reports Website

*(TIN Report 2016,2018) **Five descriptions for servitization pathways (p. 108,Neely, 2008) ***Canterbury Development Corporation **** New Zealand Manufacturers and Exporters Association

3.3 Data Analysis

The data analysis followed the two main stages in data collection. The researcher adopted qualitative data analysis approaches as described by Miles and Huberman (1994) and Yin (2009). The initial step included coding of the data using an emerging coding approach. In this initial step, we have looked for instances in the data that essentially explained the process - how firms managed the servitization transition and also the outcomes – what firms have achieved. Qualitative research often uses an emerging coding scheme to ensure a holistic outlook on the research problem (Castka and Corbett, 2016; Huxham & Vangen, 2000).

Figure 3.3 shows the step-by-step process of research stage and data analysis.

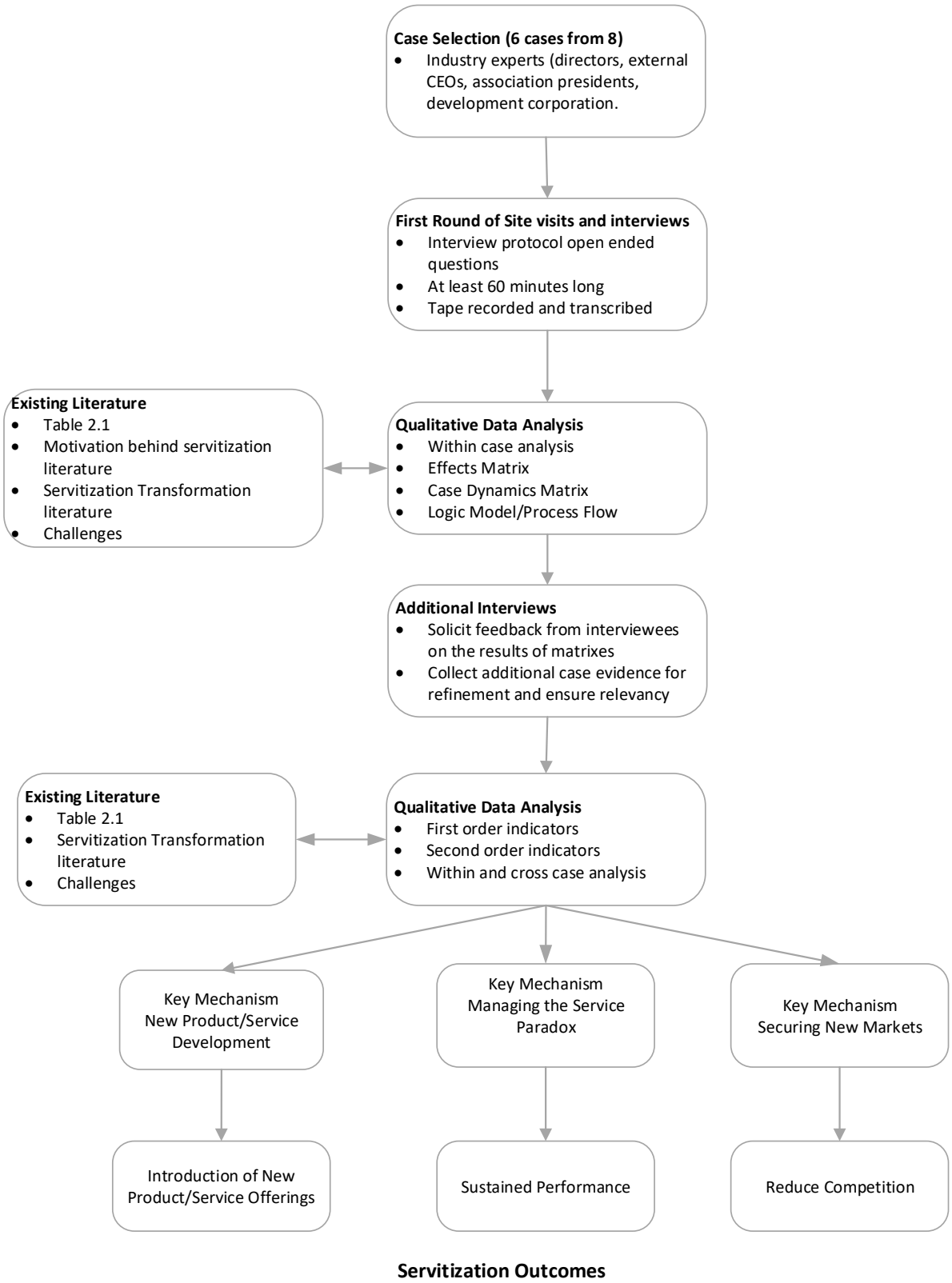

Figure 3.3: Data Analysis Structure

3.3.1 First Stage Data Analysis

Miles et al., (2014) recommend that by enquiring as to how and why an organisation servitise that the cause and effect methods of analysis would be applicable for this type of research. They stress that "good explanations need to link the explanations given by the firms we are studying with explanations we develop as researchers" (Miles, Huberman, & Saldaña, 2014). In this study qualitative research methods are used to identify cause and effect relationships and explanations as it is used by a significant number of similar studies (Barratt, Choi, & Li, 2011; Maxwell, 2004; Miles & Huberman, 1994; Voss et al., 2002). Miles et al., (2014) prescribe various methods for illustrating a research story's trajectory and outcome with a focus on change and provide foundation methods for explaining cause and effect. As mentioned previously, the organisational-level logic model (Yin, 2014) is an analytical tool in examining a set of forces for change which also traces the consequential processes and outcomes. Miles et al., (2014) suggest a step-by-step method in the creation a logic model. Foundation methods for explaining cause and effect include the Effects Matrix and Case Dynamics Matrix (Miles et al., 2014). An effects matrix explains what happened in the three-year period when data collection took place, such as example shown in Table 3.2. Effects are always the result of something that has been actioned e.g. servitisation structural changes as a cause and what happens as a result is the effect. The effect types were drawn from the Hayes et al., (2004) description of operational strategic decision categories. Hayes et al., provide a framework that reflects the diversity of operation design decisions of which the collective impact of these decisions establishes limits on an operations organisation's strategic capabilities.

Table 3.2: Effects Matrix: Organizational Changes during Servitisation

Effect Type	2015		2018	
	Primary Changes	Spin-offs	Primary Changes	Spin- offs
Structural – Capacity, sourcing, facilities, information and process technology	Work with customers to prototype new value-added services	Case hardened services ready for wider market	New partnerships to expand service offering	New added value offerings as a result of working closely with partners
Infrastructural – Resource allocation and financing (capital budgets), human resources, measurement and reward systems, product and process development systems, organisational design	Run rate business profit directed to services development R&D	Profitability declines	Change Organisation structure	New partnerships assist in providing capital for R&D

Secondly, the Case Dynamics Matrix (Miles et al., 2014) observes "how the outcomes came to be" (see example Table 3.3). The research analyst, during and after data collection is constantly trying to link data with explanations and trying to understand why specific things happen as they do and how people in the cases explain why things happen as they do. The matrix illustrates the explanations that seem relevant to a question. These explanations showed patterns and themes amongst the case studies. The results of the case dynamics method are shown in Appendix 4.

Table 3.3: Case Dynamics Matrix: Servitization

2015				2018			
Dilemmas (the problem)	Issues (whey they were perceived as problems)	How did they cope with Issues	How were they resolved (resolution of the action)	Dilemmas	Issues	How did they cope	How were they resolved
e.g. Cannot compete on standalone products	Not market leaders in technology innovation and lots of competitors manufacturing similar products	Searched for market opportunities with current customers providing value added services integrated with product	Restructure, reorganise operational and organisational e.g. retraining of current employees	Business profitability down	How to finance service research and development	Retrench and refocus, redirect run rate profits back to product business	Supply chain partnerships, selling ownership stake for capital and new opportunities in marketplace

The aim at the first stage of data analysis is to understand the state of the organisation at the time of the first stage of data collection by first observing what the servitisation transition strategy aa at 2015, where they positioned themselves in the servitization timeline and what changes had been made and the outcomes of those changes. A subsequent analysis took place in 2018. At that stage the aim was to understand what the successes and failures of those initial decisions were and what decisions had been made consequently (see also Figure 3.2 and the discussion in Section 3.1).

The next step was to explain the trajectory or path of the individual stories from the data. The logic model (see example Figure 3.4) displays, in a lineal fashion, the events and actions that suggests a plausible sequence of causes and effects. Initially certain assumptions need to be made as to what lead to what, this helps the analyst to look at what might be causing certain phenomena (Miles et al., 2014). The logic model deliberately uses the construct of "cause and effect" and the display design is linear. Following this approach will include the qualitative "influences and affects" that then becomes more of a network, interwoven and multidirectional (Miles et al., 2014). Isolating these patterns and processes, and commonalities and differences are first checked against written up field notes. The results of the individual causal chain analysis (Logic Model) for each case study are presented in Appendix 5. The cross-case logic model summary is presented in Appendix 6. Checking and verification with other data sources was completed, assisting to gather compelling interpretations ready for taking out to the field for the second round of data collection with participants.

Figure 3.4: Logic Model illustration with example

3.3.2 Second Stage of Data Analysis

Three years after the first stage of the research, a second round of data was collected from the same case study organisations. The second stage of data analysis began with a within case examination of each company followed by a cross case analysis (Eisenhardt, 1989). The researcher also conducted follow up meetings for clarification after the first round of data to compare cases. All logic models were updated to reflect second stage data. The qualitative analysis commenced with a within-case analysis of each case study organization to understand how the companies managed the servitization transition and that they continue to remain sustainable in the marketplace. Case summary reports were prepared and reviewed by the participants to improve validity (Yin, 2014).

At this point the researcher conducted a cross-case comparison of the case study organisations (CSO) to compare why there were higher and lower levels of sustaining business sustainable while companies servitized (Yin, 2014). The cross-case comparison helped rule out business specific characteristics that were unrelated to servitization (such as regional political disturbances i.e. war in the Middle East) and extract the commonality between cases (e.g. including customers in research and development stage) that resulted in an emerging coding approach to identify the reoccurring, common 34 first order indicators (far left hand column Figure 3.5). The second round of data collection focussed on gathering additional information that would help confirm the basis of the first order indicators in describing how the cases remain sustainable (or not) during servitization. By the second round, it was also clear that while some cases were successfully transitioning, some of the cases were struggling or had failed to sustain business performance since the first stage of data collection. The investigation therefore also focused at collecting the evidence of the outcomes in each CSO

(e.g. customers were not receptive to new services and were reluctant to pay for services that they had once been given for free).

Figure 3.5 further illustrates how first order indicators were grouped into second order indicators. At this step, the researcher was consulting literature as well as the data and various analytical angles (such as effects and case dynamics matrices) to group 34 first order indicators into nine second order indicators (middle column in Figure 3.5). Relevant literature was incorporated at this stage to conceptually understand the emerging concepts, which also provided an additional source of validation (Eisenhardt, 1989). This iteration process resulted in the relevant existing theories around Dynamic Capabilities, Organizational Learning and Service Paradox literature streams providing a useful conceptual lens to interpret the qualitative data. This process resulted in three high order constructs – right side of Figure 3.5.

The high order constructs are reminiscent of capabilities that firms develop during the transition to servitization. Therefore, in the subsequent text of the thesis, these are referred to as *capabilities*. Likewise, the second order indicators are in fact *mechanisms* through which firms develop their capabilities. Therefore, in the remaining text these are referred to as *mechanisms*. It should be also noted that the capabilities are in fact integrated and operating simultaneously and that is why Figure 3.5. collectively depicts the capabilities as "dynamic capabilities". This point is explained in detail in Section 4 of the thesis.

The further step in the analytical process was to link the capabilities with specific *outcomes*. The outcomes were derived from the data in a similar way as the first order indicators: the research coded areas, where the mechanisms (or capabilities) were linked to achievements (or lack thereof). Initially, each capability was linked with a primary outcome:

- *Product/Service Development Capability* primarily led to a firm's ability to introduce *new product/service offerings*.

- *Managing Service Paradox primarily* contributed to *sustained business performance* during the transition
- *Securing Market* capability primarily contributed to achieving *lower levels of competition* for a firm

Consequently, further evidence was thought to triangulate the data and to assess each firm. For instance, financial performance data from external sources was used to complement the data from CSOs to determine their "sustained business performance". At the same time, the researcher looked for the evidence of the linkages between competences and outcomes. The details of coding is explained as part of Chapter 4's sections "cross case analysis".

The final stage of analysis looked at linking the capabilities to 'outcome of servitization'. The outcome of servitization was determined as of the end of the research project (even though it is recognised that firms continue with their servitization transition). The outcomes of servitization were determined as combination of product related performance and performance achievements from servitization. The firms were labelled as *High Achievers, Potential Achievers and Low Achievers*. High Achievers were firms that were successful in generating revenue from both product and services; Potential Achievers firms that continued to be successful with their product offerings yet still to achieve significant revenues from services and Low Achievers were firms that were largely unsuccessful – sold as manufacturers or bankrupted.

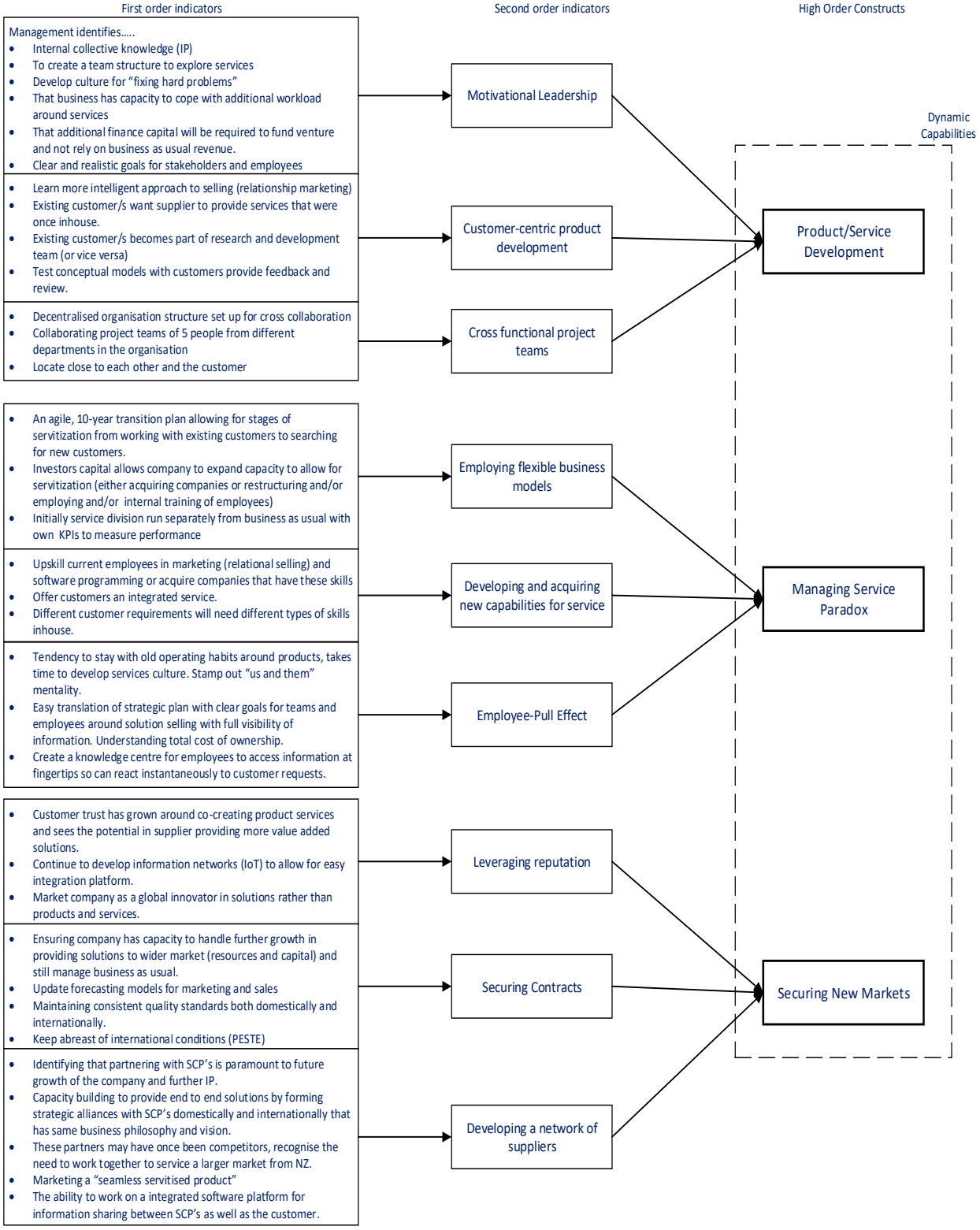

Figure 3.5: First order, Second order indicators and high order constructs

3.4 Ethical Considerations

Ethical implications have been considered for this research. Approval was sought from the University of Canterbury Human Ethics Committee (HEC) which received approval in late June 2014 (Appendix One). Participants were informed of the purpose of the study by email; they were given clear instructions and were told what the researcher's intentions are with the data (Appendix Two). The interviews were confidential and anonymous, and the results will remain anonymous and will not be aligned to a specific organization. The amount of time that participants provided was kept to as minimal as possible. Contact information was given so that participants could ask questions at any stage of the research process. The primary data will be electronically secured, and a hardcopy will be secured by the Department of Marketing, Management and Entrepreneurship at University of Canterbury.

Chapter 4: Findings

The following sections report the findings by providing a step-by-step account of the analysis that was conducted in this study. Firstly, the chapter discusses each of the three capabilities and their key mechanisms. Secondly, a discussion on how each of the key mechanisms contribute to each of the three capabilities and detail how each firm rated on capability performance. Thirdly, a cross case analysis is used to compare each of the cases in how they performed each of the capabilities, highlighting successful and unsuccessful processes undertaken during the servitization transition. Lastly, the final stage of analysis, a relatively complete and integrated view of how the businesses linking the capabilities to the outcome of servitization. The outcome was determined as combination of product related performance and performance achievements from servitization. The firms were labelled as *High Achievers, Potential Achievers and Low Achievers*.

4.1 Product/Service Development

The case data indicates that the leaders orchestrate organizational learning and capability building by using three collaborative mechanisms in order to leverage the knowledge in the organization both internally and externally. The study led to conclude that there are three key mechanisms (as shown in Figure 3.5): motivational leadership, customer-centric product development and creating cross-functional project teams. Together these mechanisms lay the foundations for the firm's capability of product/service development. All the case studies adopted different ways in implementing the three collaborative mechanisms (if at all).

4.1.1 Motivational Leadership

Leaders of organizations in highly competitive markets are faced with looking for ways to be relevant in their marketplace. Importantly our study showed there is a need to identify and recognize the value of services and the type of capabilities they need in order to deliver those services. Leadership ought to communicate their importance in providing a sustainable and sustainable future for the organization and to be the inspiration for customer centric collaboration. The leadership's communication plan is that the future of the organization will be the successful delivery of value-added services that fulfil customers' needs and add a new revenue stream to the organization's product offering. Literature reveals that managers who articulate a vision and establish an appropriate organizational culture and an incentive system will promote organizational identification and loyalty (Augier & Teece, 2009).

4.1.2 Customer Centric Product Development

Including customers in the early stages of research and development process of servitization allows for a continual reassessment of their needs by the team. The customer becomes part of the workshop and brainstorming sessions. There is customer testing and re-trialling at different stages of development. By locating close to the customer means that collaborative prototyping can take place instantaneously. Usually the customer may have initiated the collaboration as there is an eagerness for the supplier to provide the new services (the customer may no longer want to operate the services inhouse). The customer will share intimate knowledge of the service required and want to make better use of the supplier proven capability to provide the specialized service/s. This enables the supplier to move into the

service business and their focus changes from being previously transactional to a relationship-based collaboration (Kogut & Zander, 1992).

4.1.3 Cross Functional Project Teams

The management team set the foundations for organizational learning by creating decentralized project teams that consist of representatives from all levels of the organization, including the customer, to ensure the customer needs are taken into consideration early on. In terms of team structure, the team typically involves shallow management hierarchies and decentralized authority who can make timely decisions which is paramount as responsiveness, flexibility and delivery on time are key performance attributes that customers look for in quality service. Innovation requires an organization that is creative and, in the implementation phase, responsive (Teece, 2018). They are a separate team with their own monitoring of key service performance goals. The team is cross-divisional, someone from each department contributes to the team. The idea is that there is a creation of a service culture that will perform alongside the product culture to establish a set of norms and values rather than a dominant vs. counterculture as one should not replace the other. If nurtured continuously then service awareness will grow. By the management demonstrating to the team the economic potential of the service then this leads to the team valuing services. This will assist in establishing a cultural transformation as well as a structural transformation within the business environment.

4.1.4 Findings from Within Case Analysis: Product/Service Development

A good example of a company that used the three collaborative mechanisms was Case A. Management recognized that the company couldn't compete on standalone products, that their customers were wanting them to provide services, so they created a project team dedicated to exploring services.

> *"We knew we had the knowledge internally in designing a network around our products, this was identified as a new market opportunity and we formed a project team that included the customer to explore different types of value-added services".*

Customers could see the valuable data capture that they were collecting and could see the benefits of what this information could provide their technicians working out on the field. They didn't want to enter into the software analytics market, so they looked to their system installers to provide the capability.

For Case B, the customer was requiring an end-to-end solution for speciality devices. Larger competitors were not meeting timely delivery of the product, so management identified that they had those skills in-house and could charge for them.

> *"The other suppliers were viewed by the customer as providing a half-sell, no one company was bundling the pre-regulatory, design, manufacturing and quality assurance into one bundle for specialized products – we worked so closely that our customers knew individual designers by name".*

Case C worked at demonstrating what value-added services represented to the customer. They tested conceptual models with their existing customers.

> *"In New Zealand we now promote our 'better by design' process which is a collective effort and customer-led. Previously we were just doing our jobs*

and not fronting as one team to the client. It was a design job and were talking to the client we weren't recognising the type of overall solution were could provide them"

They have been successful in NZ, so have increased their workforce overseas so they can work one-on-one with their customers in the countries they are located, where they already have built close connections. Their people sit in proximity of each other, from the call centre operators to the field technicians and designers, "it is easier to provide a collective prognosis to any problems that arise".

Case D is a family business has a strong brand presence in products and is very successful but could clearly see there was a gap in the services market. They wanted to "create more customer touchpoints along the product lifecycle". They weren't the best "selling organization" and did not have a clear, holistic knowledge of the services they provided.

"We would recommend other service maintenance companies ahead of our own because our manufacturing team were used to just dealing with the manufacture and installation, it was not front of mind to them when talking to the client around maintenance".

They have since employed a marketing specialist who has been instrumental in training a more intelligent approach to selling. They are now starting to work better at selling "the total package". Because they are working more closely with their customers, they are now developing an asset management system whereby they identify, where and how machines are operating at any one time. "We have full visibility we can see the assets live online; we can react instantaneously; a lot of our competitors don't have the capability".

Case E, another sample firm, was a design engineering firm that acquired the operational business of a product manufacturer. They had ambitious goals of providing the small to medium product market with customised power turbines. It was clear that the

customers were not collaborated with early on, and there was an obligation to existing customers and to the work generated from existing manufacturing contracts. Both businesses continued to operate separately and often the two teams within the organization were at cross purposes. The manufacturing division had an obligation to existing contracts and the pressure to produce new customised designs from the engineers at the same time. The manufacturing team couldn't keep up with orders and senior management were pushing to have the new designs completed.

> *"Initially they tried to get us to work as a team and everyone worked hard to make it work but there wasn't enough resources or capacity to deal with the existing contracts let alone the new ones".*

Leadership had the vision and good intentions but did not set up any collaborative mechanisms internally or externally. The new orders were for new customers and while the demand was there, the capacity to deliver wasn't. "We basically had won new contracts without any experience in providing an end-to-end solution".

The leadership of Case F also had the vision but only after they had bought a company that happened to have a service maintenance division, they were more interested in the acquired product line. Offering services to customers was the consequence of acquiring the new product set.

> *"Initially we kept the company structure the same and operated the service business separately and were making a loss, but we could see if it was run well then there were opportunities in the marketplace".*

The lack of collaborative mechanisms meant that the company was never viewed as a "end- to-end solution provider" by their clients and revenue suffered. In 2017 a large product competitor bought the product business but were not prepared to acquire the service business which Case F still own.

The following Table 4.1 outlines the three collaborative mechanisms for the six organizations we collected data on.

Table 4.1: Three collaborative mechanisms in Product-Service Development

	Collaborative Mechanisms		
	Motivational Leadership	Customer-centric new product development	Cross-functional project teams
Definition and Rationale	To identify and recognize the value of services and communicate their importance organization-wide in providing a sustainable business future.	Customer becomes part of the problem-solving team that creates dynamic services.	Create project teams that consist of representatives from all levels of organization, providing a breadth of knowledge around products and services.
Outcome of collaboration	New product/services	New product/services	New product/services.
Case A	Management recognized that the company couldn't compete on standalone products due to mass production in Asia. Also, customers wanted company to provide services, so the organization created a project team dedicated to exploring services as a value-add to products. *"There was a lot of knowledge internally at all levels of the company around designing networks and a new market opportunity was identified and we formed a project team to explore different types of added value services".*	Customers could see valuable data capture and realised it was too costly for them to enter into software analytics, so they looked to system suppliers to provide the capability. *"The customer is trusting you with the competencies they had, and they are outsourcing to your team. They need the ability to see the people, know them, trust them is extremely important".*	They formed a project team of about 5 people from different departments exploring what it meant to provide services. *"Product relationships typically occurred at procurement level, with services there was a new cross-level of relationships occurring with the customers including CEO and the board"*
Case B	Customer requires end-to-end solution for speciality medical devices. Larger competitors were not meeting timely delivery of product for customers. Management identified that they had all the skills within house and could charge higher than average prices. "*For customers they observed that the market was only providing a half-sell, no one company was providing a bundling of product and services such as pre-regulatory, design, manufacturing and quality assurance. We developed a skill set for doing hard work that competitors didn't want to touch"* .	Company became part of the research and development team of major customers *"We worked really closely to the point that our customers knew the individual designers by name, and I would know most of the customer partners birthdays"*	There was a recognition that different capabilities that were needed by the team Management employed a marketing specialist to help train everyone in working together to provide end-to-end solution. *"Previously we were just doing our jobs, not working as one team fronting the client. It was a design job and when we were talking to the client, we weren't recognising the type of overall solution we were providing them".*
Case C	The senior management team were eager to increase IP (Intellectual Property) that would add value to their business because their current market position was threatened due to mass production in Asia. They had a close relationship with their design partner and acquired	The team worked at demonstrating what services represented value to the customer. They tested conceptual models with their existing customers. *"In NZ we promote better by design process which is a*	The company has expanded their team by acquiring necessary capabilities and are located closer to their customers in the countries that they serve. There is a growing culture of cross collaboration within the organization.

Collaborative Mechanisms			
	Motivational Leadership	Customer-centric new product development	Cross-functional project teams
Definition and Rationale	To identify and recognize the value of services and communicate their importance organization-wide in providing a sustainable business future.	Customer becomes part of the problem-solving team that creates dynamic services.	Create project teams that consist of representatives from all levels of organization, providing a breadth of knowledge around products and services.
Outcome of collaboration	New product/services	New product/services	New product/services.
	the company when the owner retired. *"We provide an integrated service and manufacturing model (design, software and manufacture). Priority was providing a one-stop shop for customers, so our team needed to work closely together".*	*customer led. The challenge is how to develop with the customer on site".*	*"We had everyone in the team sitting 20 metres of each other so you can answer all customer questions, from the call centre to field technicians to engineers, it is a lot easier to provide a collective prognosis to any problems that arise."*
Case D	Historically, they had been strong in product selling because that's how the company started. But they recognized a gap in the services market and the company goal is to grow these services. *"I work on a strategy and condense it to a plan on a page which allows them to focus on what they are doing and so when someone asks what is happening, we can refer to it. It doesn't mean it is inflexible, but it's not arbitrarily changed without discussion".*	Management recognized how the importance of working with the customer, but they admit they are not a sales organization and often do not have a holistic knowledge of the services they provide. By hiring a sales account manager there was a more intelligent approach to relational marketing. *"If your customer touchpoints are more frequent providing this can provide ongoing revenue and higher margins. Now there are different propositions: product manufacturing, maintenance and fleet management and finance which allows for more customer interaction".*	Sometimes there is confusion as to the services they can provide in-house because the divisions were all separately run and monitored. It took them a while until the team was selling working together as one unit. *"We will put other services (maintenance) companies before our own because we are used to just dealing with the manufacture and installation, and I say, 'why do you do that?'…. they had completely forgot…. it's not at the front of their mind."*
Case E	Design engineering company acquired the operating business of product manufacturer with the goal of providing the small to medium hydro-electric market with an end-to-end solution in the production of hydro-electric turbines. The design company relocated to the product manufacturer premises. The employees (design team and engineers, factory) continued to work as before on the existing contracts. *"Infrastructure as a service, we think that there is potential in the small distributed hydro market. However, the asset infrastructure model is not what we are today, and this proposition will need to be recognized and the right group of investors on board."* Company was in liquidation mid-2017. A senior manager believed there was weak leadership. *"The board were not up with the pace required as far as manufacturing was concerned (in*	Existing customers were not collaborated with on the new business model. But there was an obligation to existing customers and their existing contracts. Both businesses continued to operate separately on product and service delivery. Meanwhile, a new contract was won offering end-to-end solution but there was a lack of resources and customers' needs weren't met. *"The forward orders for the new job were thought to give the company the financial strength to offer returns to investors, but they weren't able to satisfy the customers' needs and new CEO didn't want to hear that the manufacturing team couldn't produce the design".*	Both businesses continued to operate separately and there were clear misunderstandings on what design and manufacturing could deliver particularly with the new business model. "Initially the culture was good, but I think it was always going to be an us and them mentality between the two groups – design and engineering".

Collaborative Mechanisms			
	Motivational Leadership	Customer-centric new product development	Cross-functional project teams
Definition and Rationale	To identify and recognize the value of services and communicate their importance organization-wide in providing a sustainable business future.	Customer becomes part of the problem-solving team that creates dynamic services.	Create project teams that consist of representatives from all levels of organization, providing a breadth of knowledge around products and services.
Outcome of collaboration	New product/services	New product/services	New product/services.
	delivering timely projects). The business didn't have the capital to implement what they wanted to achieve, and this impeded the growth. The board was expecting significant returns very early on and maximise their investment and get their money back and this didn't happen."		
Case F	Originally the leadership had a vision of adding a significant product line to their group of offerings and acquired the product company. The new company also had a services division. Offering services to customers was the consequence of acquiring the new product set. *"Initially we kept the company structure the same and operated the service business separately and we were making a loss, but we could see the opportunities that services provided."*	New Zealand market is being used as the testing ground for services. The customers were initially resistant to change particularly when it was expected that they pay for the service that they had been getting previously for free. "*In the last 5 years it became apparent that the customers needed support by offering them consultancy and advisory, and we had been trying to drive the change but the customer loathed change."*	The engineering graduates make up the product team and marketing people sell the products and services *"but you also need to have some product knowledge on the other end of the phone*". "*We are still learning about the solutions selling. Its more about trying to coach the salespeople how to sell a solution and we would love to do this better"*

Overall, collaborative mechanisms for product/service development are the foundation blocks in reinforcing servitization building strategy and business models. Strategy must be clearly defined by the leadership team with clear goals and the creation decentralized project teams with the ability to work very closely with the customer. This is usually best worked on with existing customers who they have previous experience with the organization and can see the benefits in the service provider performing the value-added services for them. Once the organization has successfully delivered new services, they can confidently standardize solutions and show other customers in the marketplace that they have the capability in providing the new services as Cases A, B, C and D has successfully delivered.

4.1.5 Findings from Cross Case Analysis: Product/Service Development

All the case studies have been market leaders in their respective industries so have had a past record of success in identifying sensing and seizing opportunities in their marketplace (Teece et al., 1997). A summary of the cross-case analysis is shown in Figure 4.2. The data suggest that most of the cases (A, B, C and D) had leadership that took the initiative to investigate servitization as a way of adding value to their products. The successful leaders identified that adding service capability was going to be a long-term exercise and that it may take many years to fully servitize. Successful leaders know building adaptive business models and setting long-term strategic plans that they ought to anticipate market disruptions that could derail their journey and that they may need to adapt to change of circumstances. The data indicates leaders who communicate their vision clearly to stakeholders will be providing a clear organization-wide understanding of what outcomes are expected. One of the goals is to ensure that the customer is involved at an early stage of Research and Development (R&D). Three cases (A, B and C) ensured that R&D were led by customers who were able to give immediate and informative feedback at every phase of the development of the service. In two of the cases (A and B) the customer had approached the provider as they had close relationships with them and knew that the provider had the capability to provide the services back to them. Case C management instigated the collaboration and demonstrated the possibility of servitized solutions to the customer and they agreed to be involved at an early stage of development. Case E had good intentions but did not set clear goals, so existing customers were confused and demanded existing contracts to be fulfilled, while investors expected immediate high returns. Case F did not have intentions of providing services and had no clear vision. Initially there was no desire to provide services (they had acquired the company for the product, they wanted to add to their product portfolio). It was only after the

company acquisition that they realised that valuable services could add additional revenue streams. There were no collaborative mechanisms set up and business performance suffered during this time. Both E and F never adapted to the changes and had not set up customer centric cross-functional teams to investigate servitized solutions. A, B and C rated highly as early on they had set up cross functional teams of 5 or more people to investigate what services they could provide. Management were able to convey to the team that services would be a value add to their organizations. Case D did not set up a cross functional team looking at service solutions they were relying on the organizational structure remaining as status quo. They had three divisions working separately in structure: finance, manufacturing and maintenance and they were not working collaboratively. An example of this was when the manufacturing team were asked to provide maintenance services and they referred the customer to rival firms. Management employed a marketing professional to assist in training the divisions to work together to sell a total solution which has been successful. Table 4.2 shows the cross-case comparisons of each firm how they mobilized collaboration and were rated on their success in achieving this identified capability.

Table 4.2: Cross-case comparisons in Product/Service Development

Case	Summary	*Rating
A	The CEO was very clear about what servitization meant to the organization and this was communicated to stakeholders. Cross functional teams were formed to explore services. Management tested services on existing customers who gave appropriate feedback. The outcome being an ongoing work stream and revenue.	High
B	An energetic CEO who has created multi-talented team (cross functional team) and built very close relationships with their customers (customer centric). The Management team recognized what capabilities were needed and ensured a market sales message infiltrated the team.	High
C	A motivated leader who promotes a customer led approach to design. Works collaboratively with all stakeholders and is regularly part of business think tanks. Tested conceptual models with their customers and were successful and have now expanded overseas.	High
D	Leadership recognized and identified market opportunity but has struggled in communicating to the organization about what the company represents as a service provider. Has recently employed marketing specialist to assist in training employees to sell solutions not just products. Two out of the three	Average

Case	Summary	*Rating
	collaborative mechanisms adopted, leadership but did not unify the message by creating cross functional teams relied on marketing message. Did involve existing customers earlier on in servitization transition.	
E	Leadership had the vision and good intentions but did not set up the correct business model, did not collaborate with existing clients. Did not set up project teams. Generally, communication and cross collaboration internally and externally was non-existent. The leadership was motivated but lacked two collaborative mechanisms, they were not customer led and did not have teams working together on solutions, particularly with customers. Shareholders lacked understanding around servitization and expected immediate high returns.	Low
F	The vision for services was secondary from the outset of acquiring a product company who had a service division. Very little collaboration and lack of understanding what there were providing the customers, so the customers did not value the services. Teams continued to work separately and lacked solution selling skills. Lack of motivational leadership or it came later as a secondary goal when services were recognized as being valuable. Because of the slow start they did not have collaborative mechanisms in place, teams worked in silos and the customers didn't understand why they had to pay for services.	Low

*Low level of introducing new product/services; Average level of introducing new product/services; High levels of introducing new product/services

Proposition 1: Firms who proactively use collaborative mechanisms are more likely to successfully introduce new product-service offerings.

4.2 Managing Service Paradox

It can be unwise if the expectations of the company who are servitizing think they will achieve immediate high returns from services when they have invested heavily upfront and gone through the timely challenge of reallocating resources (Gebauer et al., 2005). In this study, three transitional mechanisms were identified to show how the companies sustained business performance during servitization transition. These firms found a balance between business continuity while investing in servitization; developing and acquiring new capabilities for services and initiated the employee-pull effect.

4.2.1 Employing a Flexible Business Model

Management must first anticipate and minimise the potential resource bottleneck between competing resource requirements of both product and services. Controlling bottleneck assets is critical to capturing value (Teece, 2018). The successful case studies achieved this by increasing resource capacity which reduced the risk of losing standing business revenue and potential service quality erosion. If firms planned and allocated their time wisely between routine business and implementing new organizational requirements, then this led to achieving the necessary balance between the two and capturing value. Investing resources for new services constrains the resources available for everyday business activities which can lead to product and service delivery erosion. Unfortunately, service delivery erosion leads to customer complaints, lowering of customer satisfaction and potentially lower customer loyalty. This will also reinforce employee's belief that the service business is underperforming therefore not as important as the product business. However, increasing the service business mitigates decreasing product margins (Wise & Baumgartner, 1999). Increasing capacity by hiring employees, developing joint ventures and working with supply chain partners leads to managers minimising resource bottlenecks therefore capturing value.

4.2.2 Developing and Acquiring New Capabilities for Services

In order to increase capacity for delivering services, structural changes to the organization are needed and that can be either through training existing employees or hiring or acquiring service skill sets. Each decision will have its consequences and challenges. By acquiring skills, management must be aware that there will be coordination issues, as has been

found in this study, that by acquiring a services company does not mean that solution selling will be developed overnight. Conversely, by simply retraining employees takes time as they are changing old norms (products sell themselves) and creating new values (working as a team to sell solutions). There are transitional mechanisms at play between the dominant culture around products and the counterculture of selling new services.

4.2.3 Employee-Pull Effect

If management are motivated to extend the service business through implementing necessary organizational arrangements, an investment at employee level is prudent. Managerial motivation may be the foundation for service culture change, but the "employee-pull effect" will ensure that business continuity will happen. The employee-pull effect in servitization is defined as employees that are committed to goals set by the collaborative project teams. "Employee perceptions of extending the service business is more positive if progress is high relative to expectation, but is more negative when progress is disappointing"(Gebauer et al., 2005). Expectations are initially set by the management team. The dependence of employee perception on observed progress means that ambitious objectives which are applied aggressively can adversely affect the success of extending the service business. In this study, some companies struggled to achieve high service revenues when they had excessively ambitious objectives particularly in the earlier stages of servitization transition.

4.2.4 Findings from Within Case Analysis: Managing the Service Paradox

Case A had restructured their organization and launched a separate services division with its own general manager and set of service performance monitoring targets. The initial

strategy had been to "build it and see what happens" and there was large investment and an incremental approach to service growth. They chose to implement service capability this way instead of acquiring a services business.

"We typically didn't expect as much profit margin from the service business as we did from the product business due to the intensive labour building effort in getting the services up and running".

Profitability was in decline. "In hindsight we did underestimate the level of time, investment and risk it took to transition to delivering services". Management didn't anticipate the costs of transition and the amount of time needed for change in organizational structure and culture. They relied heavily on the retraining of their own employees to build capability and as a result it had also taken longer for the employees to understand and commit to the service business (initially negating the employee-pull effect).

"We chose to infiltrate and grow our own values around service rather than acquiring a company with a track record and credibility, in hindsight this may have been easier, but we feel there would have been integration issues".

The servitization transition was more challenging than expected due to the length of time it took because there was a tendency for the organization to remain with old operating habits around products.

"Essentially it took us a decade to change old habits and that doesn't mean you plan for nine years and implement it one year; you have to learn as you go".

Case B was part of a consortium of companies that made up a global product group. In 2017, the company was bought by a New Zealand investor which has allowed them to expand and invest more in servitized products.

"The investor can see what we are trying to do and had invested and allowed us to increase our capacity to grow and focus on transforming technology, allowing for opportunities for new business".

There was recognition that a different set of capabilities were needed as the clients required a servitized solution. The company employees had to change focus from selling products only, to selling solutions, so there was a cultural change as well as a structural one.

"We employed an experienced marketer who approached selling in a way that wasn't offensive to our engineers. The traditional engineering approach was to say that's the fluffy stuff to make it look shiny rather than relying on quality design which they thought should be able to sell itself".

Case C bought two service companies, one was an engineering design company, the other a computer software company. The evolution from product manufacturer to a servitized solution provider has taken 12 years and has been problematic with a decrease in profitability during that time.

"We have had our ups and downs where some regional markets have grown, and others haven't. If you are wrong, then you can burn through a lot of cash and if you are late to market then that market will respond negatively".

They have offset the cost of market turbulence by keeping research and development located in NZ where wage prices are lower, and by centralizing the training of technicians who travel the globe to ensure the same quality is delivered around the world. They have recently employed a service manager who had worked for Porsche. "You bring that attitude to service into an organization, then you are shifting the bar to the next level of quality". Where there had been one person previously dealing with specialized knowledge, now it is more of a team effort. "We have created a knowledge centre of excellence where all topics on each production and service process can be assessed, including the customers".

Case D management realised that the company was working in silo's and that they needed relationship marketing expertise to view products and services holistically, instead of as separate businesses. It took them a long time to find the right marketing expert to help disseminate the message and this has recently created new service opportunities with their customers.

The liquidators mentioned in their report that Case E lacked working capital and had staffing constraints. There also appeared a lack of team cohesion and a lack of communication and strategic marketing for the future. The shareholders were expecting a "quick return on their investment".

There was also a lack of commitment from employees in Case F, in that the product engineers came from a culture of not selling services. The employees were not committed to achieving what the company had set out to do which resulted in a low employee-pull effect. "Its foreign to them, we tried to get them to understand the total cost of ownership rather than its a product off the shelf with no support".

Table 4.3 shows the three transitional mechanisms at play in each case study while they are trying to integrate, build and reconfigure internal competences to find the balance between business continuity and investment in servitization; developing and acquiring new capabilities for service and the employee-pull effect in practice.

Table 4.3: Managing the Service Paradox throughout Servitization

	Transitional Mechanisms		
	Employ a Business model that brings balance between business continuity and investment in servitization	Developing and Acquiring New Capabilities for Services	Employee-Pull Effect
Definition and Rationale	Anticipate the resource bottleneck from competing resources (product and services) by expanding capacity in advance, mitigating service quality erosion.	Training employees with the necessary new skills that are needed in delivering servitized products.	Employees committed to achievable goals (not unattainable) then employee-pull effect is high and there is a commitment to extending service business.
Outcome	Business model is established	Upskilled employees	High level of employee engagement
Case A	The company invested in services and restructured, launching a separate services division with its own general manager and set of performance indicators. Total services account for 25% of company revenue with an aim to increasing to 30%. This didn't happen and profitability was in decline. In hindsight they underestimated the level of time, investment and risk it took to transition. *"Initial strategy was let's build it within the organization and see what happens mentality and there was large investment… we chose a more incremental approach to building the service business rather than acquiring a company".* *"We typically didn't expect as much profit margin from the services business as we did from the product business due to the intensive labour effort in getting the services up and running".*	Upskilled current employees with new capabilities in marketing and software programming. "*We chose to upskill our own employees and start our own service division to instil our own values…. rather than acquiring a company with a track record and credibility and bring the skill in…. this may have been easier in hindsight but there may have been integration issues."*	Transition was harder than previously estimated due to level of time it took because there was a tendency to stay with old operating habits around products. "Essentially it takes a decade to get this thing going and changing old habits around products…. but that doesn't mean you spend 9 years planning it and 1 year doing it".
Case B	This company was part of a consortium of companies which worked together to function as a global medical group committed to the design, manufacture, regulatory signoff. This attracted investment from a large medical device company. In 2017, the company went from being US backed (was sold) to being 100% NZ owned which has allowed them to expand and invest more in product development (servitized products). "*This has allowed us to expand capacity and focus on transforming technology allowing for opportunities for new business. We define this innovation as data that informs".*	There was a recognition over time that there were different capabilities involved in their work and that the clients required different types of services. "*Prior to that we were just doing our job and we weren't differentiating between product manufacture and a design job. When we were talking to the client, we weren't breaking the work into product and services*"	The company employees had to change their strategic focus from selling only products to selling solutions a cultural change as well as a structural change. "*The company employed a marketer and this ended up being a fantastic introduction to marketing because she approached it in a way that wasn't offensive to our engineers, because the traditional engineering approach is to go that's the fluffy stuff to make it look shiny rather than relying on quality design which should be able to sell itself".*
Case C	Originally a product manufacturer, they were eager to bring in IP into their business, so they acquired two companies, one was a design company, the other a software company. The evolution from a product manufacturer to a servitized provider has occurred over a 12-year period. *"In that time, we have had our ups and downs, where some regional markets have grown and haven't in others due to political reasons (Middle East affected by war). Speed of implementation is paramount, if you are wrong you burn through a lot of cash and if you are late to market then the market responds negatively".* *"We have expanded into the US, at the moment the US dollar is very high, so if you are going to pay a researcher in the US then it is probably going to cost a lot more than one in NZ…even the exchange rate itself makes it expensive plus the cost of health insurance…twice that compared to NZ".*	Offering an integrated service and manufacturing model means including the design and software programming around the product. *"The future is in software by enhancing business automation, we have employed staff that can consult and advise clients in these areas".*	The company had recently employed a service manager that has recently worked for Porsche. *"You bring in that type of attitude to service, to an organization, then you are shifting the bar to the next level of quality".* Where they may have had one person previously dealing with specialised knowledge, now it is more of a team effort. *"We have created a knowledge centre of excellence where all topics on each production and service process can be assessed, including the customers".*
Case D	Originally a family owned product manufacturer who recognized a gap in the marketplace and acquired a maintenance company to provide comprehensive maintenance for their customers. The other was to provide financial services for purchasers. They run the services business separately and initially there was a lack of understanding around what services were.	By hiring a sales account manager there was a more intelligent approach to relational marketing. Also, they hired a financial manager to provide customers with finance options. They envisage that they need to grow middle management, upskilling employees and increasing employment in the right skills.	Easy translation of strategy such as 'plan on a page' has assisted in communicating the message and upskilling has help to consolidate and grow services. They now provide fleet management services of which there are customer based KPI's that

Transitional Mechanisms			
	Employ a Business model that brings balance between business continuity and investment in servitization	Developing and Acquiring New Capabilities for Services	Employee-Pull Effect
Definition and Rationale	Anticipate the resource bottleneck from competing resources (product and services) by expanding capacity in advance, mitigating service quality erosion.	Training employees with the necessary new skills that are needed in delivering servitized products.	Employees committed to achievable goals (not unattainable) then employee-pull effect is high and there is a commitment to extending service business.
Outcome	Business model is established	Upskilled employees	High level of employee engagement
	"We've just got to be careful we don't get ahead of ourselves and set realistic goals because right now we are crawling around on all fours and we want to be able to do the marathon"	*"We admit we are not the best sales organization. Initially we have survived on equity in the brand, it's not to say that our people aren't good salespeople, but we are naïve, I've spent 5 years trying to find a good sales manager to help train us".*	set different priority response times to jobs. *"We have full visibility; we can see the fleet live online our employees can react instantaneously– a lot of our competitors do not have the capability".*
Case E	A design engineering firm bought the operational contracts of a manufacturing firm along with the manufacturing team that ran the contracts. They had responsibilities to deliver on existing contracts and weren't meeting customer timelines. While management identified a gap in the market to provide end-to-end hydroelectric solutions for smaller projects, they hadn't communicated with existing customers or as to co-creating new hydro innovation. They hadn't worked with the manufacturing team to create the designs. The board and shareholders wanted maximum returns to their investment and wanted a quick turnaround. Shareholders forced liquidation in mid-2017. *"The liquidators had concluded that the company lacked sufficient working capital, had staffing constraints and had little in the way of its own intellectual property despite winning hydroelectric projects"*	Management recognized in 2015 that they needed more skills, particularly in sales and marketing however, this was never implemented after company formation. *"We need more skills across the company as well as additional skills such as building a sales and marketing team".* *There was a desire to standardise the type of product whey were manufacturing to get economies of scale, in hindsight the idea was valid, but the implementation was flawed.* *"At the time the original company had been a design house and it made sense to bring the design house and manufacturing together, but we weren't meeting customer targets for existing work".*	The company had started well with a very good supportive CEO and there was potential for both teams to work together, however with the obligation of old contract work and new designs here wasn't the commitment to the innovative designs, mainly due to a lack of cohesion between the two disciplines. "*Initially the culture was good, but I think it was going to be an us and them mentality between the two groups, design and engineering. There was an expectation that the design team would come up with a design and the engineering team said they couldn't deliver".*
Case F	After acquiring a product manufacturer with a services division, they continued to operate the services company separately. It was apparent that the customers needed support by offering them advice on utilising the data collected. The company took the initiative in instigating the change at the reluctance of the customer not liking change and not wanting to pay for the services. "*There are things that you end up doing which you don't charge for and the customer doesn't want to pay for, we knew because of this the model would initially be a loss-making entity."* Eventually, after a downturn in the world's dairy market, (in particularly the Brazilian economy where they were based) they sold their product-based business to a large competitor without the service business as it wasn't seen as profitable and the value add of the services weren't seen as sustainable. *"It's small and it will logically fit with a larger entity who might value that part of the business. The boards view is that as it sits now it's not sustainable on its own it really needs to be part of a larger business"*	As a result of them acquiring the company that had a service division, they found they needed people with more marketing and customer relationship skills as well as technical.	Demonstrating the value add of services was something that the product engineers weren't trained to do. *"Its foreign to them…. it's about trying to get them to understand the total cost of ownership rather than it's a product of the shelf with no support".*

*High level of sustained firm performance; Average level of sustained firm performance; Low level of sustained firm performance

All the case studies experienced complications in implementing organizational activities successfully. These issues are often unanticipated side effects of the transition process. Companies A, B, C and D have been actively managing the impact of these side effects. Where possible, managers must plan the servitization transition to ensure that goals are met and an increase in capacity overcomes the resource bottleneck and that the employee-pull is enacted in order to manage the service paradox (Gebauer et al., 2005).

4.2.5 Findings from Cross Case Analysis: Managing the Service Paradox

The data suggests that all of the cases found it difficult to manage the service paradox and that the context plays a significant role. All the cases employed slightly different business models to implement services. The findings showed that if firms employed a business model that looked after business as usual as well as allowing for the addition of services either by restructuring, retraining existing employees and/or working closely with supply chain partners, then there was a higher chance sustaining business performance. The rapid implementation and adjustment of new business models require strong dynamic capabilities, including an organization that has been designed and primed to be innovative and flexible (Teece, 2018). Successful cases recognized that they needed additional investment in order to increase capacity. Cases A and C did not anticipate the cost and amount of time needed for changing their business models. As a result, they have found it difficult to sustain business performance due to not planning for potential resource bottlenecks and this has left them vulnerable to revenue loss. Case B's ownership structure had changed from that of being part of a large US conglomerate to be 100% NZ owned. It changed because the company had a different vision to the conglomerate. The NZ investor had confidence in their future vision

and abilities to deliver the products and services and as a result they invested a sizeable amount of capital.

Case C's customers are in over 65 countries. As a result, there are more implementation side effects than other cases as they are affected by a lot of external environmental pressures such as regional political and legal issues. They have counterbalanced this by training NZ technicians locally who travel the world to train technicians in other countries ensuring a high level of quality is maintained globally. The company's owner has invested heavily and there is evidence that existing business revenue has been affected.

Case D, a very successful product business has been late in acquiring marketing capability and consequently were slow to react to a lack of employee engagement to the new set of services that were now being offered. They have reacted by employing a marketer and this has led to a more holistic way in which they sell solutions to their customers.

Case E and F did not employ the right business models, had no clear strategy therefore were not in a position of strength to manage implementation side effects. As a result, they fell victim to the service paradox and failed to sustain firm performance. Table 4.4 shows the cross-case comparisons of how each firm managed different aspects of the services paradox and were rated on whether they sustained firm performance.

Table 4.4: Cross-case comparisons of managing the service paradox

Case	Summary	*Rating
A	Management didn't anticipate the transition costs and the amount of time needed for change. They restructured, cut staffing levels and relied on the retraining of existing employees and employing in new skills such as computer software programming. They set up a business model where they ran a separate service department with its own performance parameters. It has taken longer than expected for employees to commit to the new service business.	Average
B	Management did recognize that added investment was needed in order to increase capacity, mainly staffing numbers. They have developed the right skills and brought in additional skills like relationship marketing to upskill current employees in how to sell services. It is a relatively small nimble team who work collaboratively, as a result, there has been a high employee-pull effect.	High
C	Management have expanded quickly and operate internationally in 60 countries. They operate their research and development in NZ and training technicians in NZ who then travel the globe to train local technicians to maintain high service standards. They have needed to invest a lot of money and grown quickly and are not quite reaping the benefits of the service revenue streams. Transition has taken longer than expected.	Average
D	Management historically are not good at selling services. They did realise that they needed some relational marketing experience and to operate as a total solution provider and not a product manufacturer. This has led to creating new service opportunities with their existing customers.	High
E	Lacked capacity to complete new servitized work. Insufficient working capital, staff constraints, lack of team cohesion. Added pressure from shareholders who wanted a quick return on their investment. Liquidated in 2017.	Low
F	Management had no clear strategy on how to integrate the new services division and was run separately to product division. Services division did not make any money. Company sold without the services division as was not seen as a value-add by the new owners.	Low

*High rating in sustaining firm performance; average rating in sustaining firm performance; low rating in sustaining firm performance

Often management underestimate the time and investment needed in order to sustain firm performance. Firstly, the company should ensure that they have the capacity to deliver services and not affect current business revenue streams. The data suggests that if a firm set up business models that support both product and services they will adopt all three transitional mechanisms (employing a business model that brings balance between business continuity and investment in servitization; develop and acquire new capabilities and achieve the employee-pull effect) the organization must have a strategy for both business models to sustain business revenues but remain flexible when changes are needed. In order to become

a proficient service provider, they must gain the trust of the company's stakeholders: importantly existing customers, employees and shareholders.

Proposition 2: Firms that proactively manage the service paradox are more likely to sustain firm performance during the servitization process.

4.3 Securing New Markets

The next step for the servitizing organization is to gain acceptance as a provider of new servitized products and to sell to the wider marketplace by securing new contracts. In this study three key marketing mechanisms were identified to show how the case studies extended and secured servitized business to the wider market i.e. reflecting their past success in becoming a reputable provider; increased the number of servitized contracts and developed strategic alliances with their partners.

4.3.1 Leveraging Reputation

Succeeding in the services market by working with existing customers to build up service experience will lead to new customers having the belief that the provider has the experience to deliver services. Past success with product-related services reduces the perceived risk to new customers and will lead to an increase in potential product and customer-support services. The provider has mastered selling and marketing expertise in order to attract and capture future customers. The provider needs to prove they have the capacity to take on new contracts and recognize if more resources both internally and externally are needed to increase in their ability to provide end-to-end solutions.

4.3.2 Securing Contracts

To secure new service contracts the provider must have built up a reputation in services, recognized the organizational arrangements necessary to take on new contracts in the domestic and international market. In this study while expanding into the international market these case studies looked to develop their relationships with overseas suppliers either by contracting joint ventures or strategic alliances with local supply chain partners. Precise market forecasting at this point ensures the business make the correct decisions around resource capacity and production. The provider will have the capacity to take on future contracts with the right amount of service experience, alongside the right strategic partners.

4.3.3 Developing a Network of Suppliers

Successful case studies formed strategic relationships with supply chain partners in order to provide unique servitized propositions for customers and capturing value. There is an external search for partners who have similar business philosophies and vision for business as they do. In some cases, it is cost effective to partner with supply chain partners rather than trying to provide some of these services inhouse. The alliances are competing on service quality versus trying to achieve lowest cost by providing unique, customised solutions. These unique offerings also assist in raising barriers to competition (Barney, 1991). The ability to be able to build different business models is assisted by customized IT platforms that can disseminate valuable information to partners and customers globally. In some of the case studies who provide service orientated Product-Service Systems (PSS) the product incorporates services into the product itself and the value-added services are offered as an

integral part of the offering e.g. asset management, network monitoring systems and call centre services.

4.3.4 Findings from Within Case Analysis: Securing New Markets

With the successful firms, management have recognized the competitive environmental triggers and proceeded to finding ways to create value by changing organizational arrangements and widening the marketplace that they compete in. They have navigated their way through servitization and are successful providing services to their existing customers, then the company's next step is securing new servitized work contracts in a new wider marketplace. Three key marketing mechanisms were identified as to how to successfully grow market share in their new marketplaces. They are: Leveraging their reputation in services; Securing future servitized contracts; Developing a network of suppliers who can assist in providing the end-to-end servitized solutions.

Demonstrating the value-add of the services and reducing customer risk-adverse attitudes increases trust and acknowledgment that the provider can meet their increasing needs. Building a reputation for quality services introduces opportunities in the wider marketplace whose customers require similar value-added services that are now on offer.

Case A started their servitization journey by successfully providing maintenance-support services. The customers could see the potential in the supplier providing more value-add services and so worked with the provider in growing these capabilities inhouse. This facilitated organizational learning which enhanced the skills and knowledge by refinement, efficiency, improvement and exploitation of first order and second order indicators (March, 1991).

"*The customer trusts you with the competencies they once delivered. They are outsourcing that work to you and trusting you with the information they held as valuable to their business and transferring that business risk to you".*

The process in developing their service skills was a result of growing software knowledge around networks has led to Internet of Things (IOT) computing "we are on a massive growth curve as we have picked up some larger deals in North America". Case A were owned by a trust with a caveat against selling the company to an overseas business. As a result, their ability to raise capital for investment was restrictive. The initially tried to finance servitization through existing business revenue but they realised when profits began to decline that they needed to change organizational arrangements e.g. their ownership structure in order to raise the capital they needed for investment. Changing the ownership structure allowed them to sell a 40% minor share to partner in the industry which has also introduced them to new international customers that their partners have access to.

"We are about to sell a 40% stake to a third party. They like what we do, and we know that working with them will mean we have access to more overseas markets".

They have searched for supply chain partners in NZ and considered partners who were once competitors to help provide end-to-end services. They have recently partnered with another large NZ company who is in alignment with their business philosophy and vision.

"More of our customers were looking for customized solutions that span across our traditional mobile communications, so we will design, deploy, provide support services and maybe some managed services (outsourcing) alongside our partner".

Case B's customers were wanting more of the pre-regulatory and design work completed as well as the manufacture the product. They proved they had the capability in providing a specialized work package so trust and loyalty were growing. "We developed a

real skill set for doing hard things that other competitors didn't want to do, so the customers kept coming back".

The next step was for them to improve profitability by securing more contracts and ensuring that they are monitoring and measuring performance. "The better you are at forecasting marketing and sales, the better it is for production to make more accurate decisions for the future". The company is now actively selling to new clients in the wider marketplace rather than just serving existing customers.

"We were selling to existing customers who we had a relationship with, but we know there are a lot of other customers out there, so the goal is to go and get them".

Case C has established themselves as a global innovator in metal systems, they provide design, software programming, manufacturing and installation. They have trained customers in the use of the computer software and now provide training around different user levels of their computer modelling (beginner, intermediate and advance).

"Existing customers who have our software platform graduate to our updated platforms…. we enable them to use our technology, then we provide ongoing best practice training on site, se we train their people and help them stage pilot projects".

The company had identified the gap in the marketplace. They have invested heavily and needed to expand their services to receive economies of scale. They have recognized that they will need to partner with other suppliers in order to increase profitability.

Case D has had a very long history in providing quality products. They have built relationships over a long time with their existing clients. "Once you have their trust then you have the ability to sell other services, while it was simpler just selling products there are now more ways to grow revenue". They no longer identify with the food product market but with the food services market and they can provide services through their ERP technology. They

are still giving away some of their services for free "but we are itemizing these on our accounts so that they can see they are getting them for free". Customers are now approaching them to provide end-to-end solutions "we can give them a printout showing where all their equipment is and the current condition of it". They have relied on their current service model for New Zealand but realise that they do not have enough capacity for it to be scalable into Australia. They have looked to entering strategic alliances with supply chain partners in Australia "we won't need to employ any further people inhouse. We will rely on our ERP technology to provide a seamless operation with our partner".

Case E were design engineers and they acquired the operations business (not the assets) of a product manufacturer. Both had very good reputations in their respective industries but had no previous experience in providing servitized offerings.

"We had won an $8.5 million contract to refurbish a piece of machinery and these forward orders were thought to give us the financial strength to offer returns to investors".

Previous contract obligations with the product manufacturer were still expected to be met.

"They weren't able to satisfy the existing customers' needs and our new CEO didn't want to hear that the manufacturing team couldn't produce the new designs, so there were all sorts of technicalities that meant eventual failure of meeting contract specifications".

The formation of the company had promise of success at the time of acquisition, but they were not meeting their existing contractual conditions, let alone the new servitized ones. "The business just didn't have enough capital to implement what they wanted to achieve, and this impeded growth".

Case F offered services because of acquiring a company which had a product set, they were interested in. They never fully committed to integrating the new service business.

"It was apparent to us that our clients were needing assistance to use the technology associated with our product however there did seem a reluctance by the customer to pay for the services that they thought should be part of the product price".

They tried to collaborate with existing customer and were starting to work with them on servitized solutions.

"Sometimes the only way the customer can understand is by doing it and then deciding to invest, the challenge had been to create a pricing package and demonstrate the value add of services".

This revenue was necessary to increase capacity in providing services. The company did not enter into any partnerships with a view to expansion and eventually they were bought by a large global product competitor.

"We had been working on this deal for two years, to sell the service business as well but they didn't want it (it wasn't making a profit) so we only sold the product business".

The focus turned to selling the company and because they had not built the services to a point that was adding value for their customers along with a profitable revenue, the new buyer did not see the value in the services part of the business so did not buy and remain in product manufacturing.

Table 4.5 shows the three marketing mechanisms that management should adopt in order to grow their customer markets. The successful case studies are leveraging their own reputation in quality product and services, then securing new contracts and developing a network of trusted suppliers that can jointly provide end-to-end solutions.

Table 4.5: Securing New Markets

Marketing Mechanisms			
	Leveraging own Reputation	Securing Servitized Contracts	Developing a network of suppliers
Definition and Rationale	Past success with product related services reduces perceived risks and leads to increased customer support services	Recognizing potential resource bottlenecks by ensuring having capacity and resources to take on new servitized contracts both domestically and internationally.	Forming strategic relationships with supply chain partners to provide unique servitized propositions for customers.
Outcome	Customer Satisfaction from existing customers	Increased number of servitized contracts	Raising Barriers to Competition
Case A	The company started out in providing product related services such as maintenance and support. The customer trust has grown over time due to the co-creation of unique services and the customers see the potential in the supplier providing more added value services, so works with the provider in growing those capabilities. *"The customer is trusting you with the competencies they once had, they are outsourcing the information they held as valuable and the risk to you".* They continue to develop their solution-based platform by developing SCADA networks, future development in their used of Industrial Internet of things. *"We are on a massive growth curve as we have picked up some larger deals in North America".*	The ownership structure was very restrictive in how they could raise capital (caveat to selling to overseas company) so they changed organization structure and allowed a third party to take a minor 40% stake in the company and this allowed for an injection of capital that expanded our resources and capacity to take on servitized propositions both domestically and overseas. *"We are about to sell a 40% stake to a third party. This will inject a whole bunch of capital. It's because they like what we are doing and have the same vision"*	Management recognized the value of services but not at the expense of the product business They looked externally to the marketplace to understand who they could partner with and have recently partnered with another large NZ enterprise company who aligns with their business philosophy and vision. *" More of our customers were looking for solutions that span across our traditional and mobile communications….so we will provide a design, deploy, support services and maybe some managed services in there as well along with our partner"*
Case B	Requests for work progressed to more design work as well as manufacturing the product. Success meant trust and loyalty was growing, the client could see the company's capability in being able to provide a more specialized package. They were now completing all the pre-regulatory work as well. *"For customers they observed the market was providing them a half-sell…it's like I am going to design this for you, now you go find someone to make it for you. The customer does not want to do that as they think you were taking care of that…. we started to develop a real skill set for doing hard things that companies don't want to do".*	In mid-2017 ownership changed from US backed to 100% NZ owned. As part of the new plans, the company has moved to a newer, larger facility. Their mission is for stable foundations, world class facilities and world class people. The next step is to improve profitability by monitoring and measuring it. *"Profitability and marketing sales go hand in hand, the better you forecast your marketing and sales this helps production make better decisions".* *"We are accelerating capacity by increasing employment, another deployment occurring in 2019"*	The company is now actively selling to new clients in the wider marketplace rather than just serving the existing clients. *"We were selling to existing customers who we had a relationship with, but we know there is a lot of other customers out there, so the goal is to go and get them".* The company has expanded to Australia, with a similar business model but with more customer touchpoints. They are exhibiting their products and services in a large trade fair in North America for the first time in 2019.
Case C	They have established themselves as a global innovator in the rapid delivery metal framing systems. They now provide building design, software programming, manufacturing and delivery. The customers can progress from being a beginner to intermediate to advanced user in their modelling software technology. "*In Dubai, existing customers who have our software platform graduate to our updated platforms…. we enable them to use our technology, then we provide ongoing best practice training on site, so we train their people, staging pilot projects".*	The priority was providing services for existing clients. They have expanded their business to locating closer to their customers using local people. While they have grown in some regional markets, they haven't in others due to political unrest. So, their business hasn't grown in profits but slightly declined. *"At the moment it seems that we keep running just to keep in the same place"* – in an industry where speed of implementation is paramount.	Most of the core product and services come from within house but there is a recognition that in the process information business there is a need for better partnering and collaboration with other companies to provide a seamless product. *"It's about finding other companies who have got the piece to the puzzle so that we can make the whole puzzle work for the customer – we have recognized this as important for the future growth of the company".*

Marketing Mechanisms			
	Leveraging own Reputation	Securing Servitized Contracts	Developing a network of suppliers
Definition and Rationale	Past success with product related services reduces perceived risks and leads to increased customer support services	Recognizing potential resource bottlenecks by ensuring having capacity and resources to take on new servitized contracts both domestically and internationally.	Forming strategic relationships with supply chain partners to provide unique servitized propositions for customers.
Outcome	Customer Satisfaction from existing customers	Increased number of servitized contracts	Raising Barriers to Competition
Case D	The company has a very strong reputation in product quality. They have built relationships over a long time with their existing clients. *"Once you have their trust then you have the ability to sell other services"* *"Life was potentially simpler with just products but now life is better with more options to grow revenue. However, if you annoy the customers then there are plenty of other options in the marketplace".*	The market they identify with is the food service market, not the food product market and they are able to provide service through ERP technology. They are still giving some of their services away for free however they are itemizing these on their accounts "so they can see they are getting them for free". *"Customers are now approaching us to provide an end-to-end solution, we can say here is a printout that will let you know where all your equipment is and the condition of it"*	They have looked at their current service model in NZ and it is not scalable to the wider marketplace. To do what they are doing in NZ and Australia they would need to "invest a lot of money and have an army of people which is what we would have done traditionally" *"We have signed a joint venture agreement in Australia which will mean we won't need to employ any further people in-house. WE will rely on ERP technology to provide a seamless operation with our partners".*
Case E	A design company bought a product manufacturer, both having good reputations in their fields and had an idea that they would offer turnkey solutions internationally from "water to wire". They had no previous experience in end-to-end offerings (no IP) and had not worked with existing customers in providing the new servitized offering. *"The board and shareholders were trying to maximize their investment and get their money back there was a sense that this needed to happen before anything else".* *"At the time we had clinched an $8.5 million contract to refurbish a flood-damaged hydroelectric plant, these forward orders were thought to give us the financial strength to offer returns to investors".*	Clients who had existing contracts with the product manufacturer were still expecting to have these contracts fulfilled (obligated to provide business as usual). *"We needed ongoing injection of capital to build enough capacity and resources to handle both businesses as usual and the new servitized business which we didn't have"* *"They weren't able to satisfy the customer's needs and their personalities (management) were quite strong, the new CEO didn't want to hear that the manufacturing team couldn't produce the design, so there were all sorts of technicalities that went towards failure including not having the right people at the top".*	The formation of the company had promise of success at time of acquisition. They had clinched two overseas contracts and had set up offices overseas. There had been a desire to standardize the type of servitized product they were manufacturing to get some economies of scale. *"The business just didn't have enough capital to implement what they wanted to achieve, and this impeded growth".* *"The design business had tried to acquire the IP from the existing contracts from the manufacturing company, but it wasn't the IP created in conjunction with the existing customers".*
Case F	Originally a specialist manufacturer of high technology agricultural products, the acquisition of a company who had new product technology meant that they had also acquired a services division (call centre, maintenance support). They didn't have experience in the services market but saw opportunities to expand but never fully committed to integrating business to provide a servitized solution. *"Offering services to customers was the consequence of acquiring the new product set, it also became apparent to us that our clients were needing assistance to use the technology however there was a reluctance of the farmers to pay for services and they didn't like change"*	They did try to collaborate with existing customers and were starting to work with them on servitized solutions. This was on the promise that the company would be able to deliver. *"Sometimes the only way the customer can understand is by doing it and then deciding to invest. The challenge had been to create a pricing package and demonstrate the value add of services and that worth was more than the sum of the product. This revenue was necessary to invest in expanded capacity".*	The company never entered any partnerships with a view to expanding servitized solutions because they were bought out by a larger competitor. At year ending March 2017 the company reported a net loss. "We had been working on a deal for the last two years and thought the larger competitor might be interested in the whole business. Consequently, all the effort and focus went on executing the deal without the service part of the business because we didn't have the time or the bandwidth".

Servitization transition is a long-term process. Two of the cases, A and C have taken at least 10 years to manage implementation side effects and create the right business model around products and services. When the right organizational arrangements and supplier networks are in place they can move into the wider services marketplace. Providers need to

prove they are reliable in meeting service quality measures, having flexibility, responsiveness and delivery on time (Bustinza et al., 2013; Prakash, 2011; Roth & Van Der Velde, 1991). The provider must build the necessary experience in delivering new services. The customer trusts the provider with their intellectual property it once guarded as their own business. The success in working with existing customers will demonstrate to new customers and willing supply chain partners, that there is a market for servitized solutions and that the company or strategic alliance has the capability in providing the servitized solutions.

4.3.5 Findings from Cross Case Analysis: Securing New Markets

All the cases had a reputation in manufacturing in providing high quality products. They recognized that past success with product related services led to customers growth in confidence that the manufacturing could successfully take over services which led to wanting the manufacturing to provide customer supported services. The findings suggest that most of the cases A, B, C and D have leveraged their reputation in providing products and product-related services in order to secure customer support service contracts with existing customers. Management recognized that by being successful in providing product related services that this led to an increase in customer trust. However, in order to increase selling service solutions to the wider market they would need to increase capacity to take on the new servitized contracts. “To do so, the firm must reconfigure fundamental elements of its business model and its current resources and break embedded path dependencies that are faulty in the new service environment” (Kindström et al., 2013). Each of the cases looked to reconfigure in different ways dependant on their existing organizational arrangements. By doing this there was a new set of challenges, system integration and coordination of the supply chain (Johnson & Gustafsson, 2003). Case A changed their ownership structure so they could sell a minor

ownership stake to invest in growing capacity and gain accessibility to external markets. Case B bought on new investors (located in NZ) that were more aligned with their specific vision. Case D have entered into a joint venture with an Australian supply chain partner in order to provide service solutions in Australia. On the other hand, Case C who were already located in over 65 different countries had recognized at the second meeting that they need to enter strategic alliances to achieve economies of scale for services. "Services do not enjoy economies of scale like products" (Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003) they can't provide everything to everyone and they are now looking to set up external alliances so they can. Case E who had managed to secure overseas contracts (the demand was there) before they had tested their ability to manage existing contracts in NZ, were unable to meet contractual requirements and failed within a couple of years. Case F had sold their product business before they had attempted to reconfigure their business and make a profit from services. Case A, B, C, D who were successful product centric firms had identified their strengths and weaknesses and built multifunctional supply chains that has eventuated in creating service innovation.

Table 4.6 illustrates the cross-case comparisons of how the firms managed to secure new markets and rated on their success at whether they did so lowering competition.

Table 4.6: Cross-case comparisons of securing new markets

Case	Summary	*Rating
A	The company had a very good reputation around products and the co-creation of unique services had grown customer trust. Recognized that they needed to raise capital to increase resources, changed ownership structure which allowed them to sell minor stake in company. Has new joint venture partner to assist in delivering end-to-end solutions to customers both domestically and internationally. New partner has allowed access to new markets.	Low
B	The success from working with existing customers has meant the business is growing and they are continuing to expand and increase capacity that fuels growth. They are now looking to partner with other customers further afield starting with the Australian market.	Low
C	The company identified the gap in the market and are recognized globally. They are only breaking even; they have had to invest heavily to increase capacity including buying two companies. They have also recognized that they will need to partner with other companies to provide end-to-end solutions.	Average
D	The company has leveraged their reputation for selling high quality products to their customers and have increased revenue by selling value added services to them. They have expanded into Australia where they have entered into a joint venture with a supply chain partner and are taking on larger contracts.	Low
E	There was market demand for the servitized solution for small to medium sized project work and they had won some overseas contracts, however there was a lack of collaboration with customers and a lack of capital for expansion and unrealistic expectations of short-term profits from the investors.	High
F	Focus turned to selling the product-based part of the business. They had not built servitized IP so the company that acquired the product business is a large global product manufacturer who weren't interested in providing services.	High

*Low level of competition; Average level of competition; High level of competition

The successful firms, A, B, C and D recognized their strengths and weaknesses as an organization and grasped that they needed to reconfigure their existing organizational arrangements to increase capacity. They have leveraged their reputations to sustain and grow their business. This led to an increase in customer confidence providing newly acquired services. This demonstrated to the other supply chain suppliers to form alliances and that they were competent to take on the added responsibilities of service contracts in the wider customer market. These key processes led to our third proposition:

Proposition 3: Firms that secure market capability are likely to face lower levels of competition.

4.4 Interlinking capabilities

So far, the findings and propositions focused on the capabilities and mechanisms separately. Specifically, the proposition linked the capabilities to primary outcomes (as described in Chapter 3). The propositions so far determined that:

Proposition 1: *Firms who proactively use collaborative mechanisms are more likely to successfully introduce new product-service offerings.*

Proposition 2: *Firms that proactively manage the service paradox are more likely to sustain firm performance during the servitization process.*

Proposition 3: *Firms that secure market capability are likely to face lower levels of competition.*

The findings revealed that there are commonly held interlinked capabilities that the successful firms utilized compared to the unsuccessful ones, where they were either missing or not developed. Kindstrom et al (2013) study stated "that there is no single best way to become service-orientated" and hinted at "path dependant characteristics of dynamic capabilities, in which firms may practice differently in terms of the sequence in which they develop different sets of capabilities" (Kindström et al., 2013). Indeed, Oliva and Kallenberg (2003) study concluded that the transition pathway is made up of triggers, goals and actions where the triggers act for change and organizations addresses them (goals and actions) in a way that assists in the development of capabilities as shown in Figure 2.4.

The findings revealed that the case study organisation's transition is made up of triggers, goals and actions but they also took different pathways dependent on their developed, developing or lack of developing capabilities. A common underlying pattern in all successful cases was a focus on the integration of and interlinking of capabilities. A servitizing firm might, for instance, be triggered by their customers request for them to take over inhouse services that the customer once performed and therefore need to work closely with the customer to understand how to provide those services. The focal firm implements collaborative mechanisms for new product service development e.g. customer led design processes. However, if a firm lacks resource capacity, they may be slow to incorporate the supply partners in order to provide the whole end-to-end solution and secure the market. For instance, Case C while implementing collaborating mechanisms, underestimated the marketing mechanisms (specifically, networking with suppliers) which slowed down the development of new markets and consequently, introduction of new product/service offerings. Case D and E had customers who demanded new service contracts, but they did not have adequate organizational arrangements (organizational structure) or experience to provide new services and failed to develop the capability. Case A had limited resource capacity to run both product and service divisions which meant they were unable maintain business performance (manage service paradox) so needed to change the ownership structure in order to raise enough capital to resource servitization. However, in recognition of a lacking capability, Case A successfully implemented an ownership structure change and now have a 40% business partner who has offered market expansion opportunities domestically as well as overseas.

Table 4.7 outlines the case study organizations different pathways which include the triggers, goals and actions specific to their servitization journey.

Table 4.7: Cross Case Analysis – Triggers, goals and actions (Oliva & Kallenburg Process Model 2003)

Case	Triggers	Goals	Actions
A	• Internal integration issues, retraining employees to accommodate services. • Ownership structure (founders' caveat) limits ability to raise capital • How to keep R&D in NZ (initial founder's caveat) • Limited resource capacity	• To have everyone communicating with the same servitization goals • To be able to raise finance both product and service divisions with enough financial backing to enable more resourcing • Increase niche market globally • Keep R&D in NZ by providing manufacturing and services allow for this	• Corporate restructure. Less technical engineers, more computer engineering expertise • Sell 40% minor stake in company (more capital and access to international markets) • Create strategic partnerships (SCP) to deliver end to end products and services and to access wider markets locally and overseas
B	• Ownership structure. (Joint venture partners and directors have opposing visions) Limiting resource capacity • Lack of marketing experience • Raw materials are scarce. US manufacturers need raw materials for their own marketplace, not exporting as much. • Keep R&D in NZ and isolated from overseas competitors • Keep manufacturing in NZ as NZ dollar is good for exports more NZ dollars	• Increase niche market globally, with firm's own branded product • To have everyone communicating with the same servitization goals • Less reliance on raw materials • Look for new investor/partner • Build IT system to allow for seamless communication • Increase internet marketing • Develop "data that informs technology"	• 100% NZ Investor • Build company, build profitability, expand product development. • Buying $1 million manufacturing plant and equipment • Employing more people • Decrease resource dedicated to bespoke, contract manufacturing and increase bundled signature range (branded product) • Employed marketing specialist to help integrate firm to sell servitized products. • Setting up Australian division • Attending US trade shows.
C	• Profitability down • Limited resource capacity (rely on investment from business owner) • Integrating the company message to vast international team which are in 65 different countries and time zones • Responding to customer demands internationally • Some markets aren't performing (Political regional conflict (Middle East)	• Need to increase customized work that have higher margins (product plus services) • Financing – limited owner investor. • Located in 65 countries, marketing the same message worldwide. • Become Master of Mass localization. • Improve speed of implementation of product and services.	• Has recognized that needs strategic supply chain partners to assist in the delivery of end to end product and services. • Set up after hours IT help to respond to customer demands (more online input) • Create "centre of excellence "Create good documentation and system processes (IoT). • Train local technicians that travel the world training local technicians so delivering the same quality services. • Employ top service managers (recently employed a service manager from Porsche)
D	• Dealers and distributers creating barriers in dealing with customers • Having a product selling background and not a service selling background (family business) • Lack of internal team cohesion (two companies acquired, financial services and maintenances services) • Lack of marketing experience (do not know how to "sell") • Lack of customer relationship experience (not used to working with customers)	• Cut dealers out of relationship, deal with customer directly. • A wish to expand market and number of customers. • Improve marketing message to sell integrated product and services. • Improve team cohesion, people working together • Work more closely with current product customers to expand services • Increase niche market, expand internationally (initially Australia, then UK)	• Employed marketing specialist to help integrate firm to sell servitized products. • Organizationally created "plan on a page". Not too stringent but to veer away from plan must have a strategic reason. • Enter into strategic contracts directly with customers • Recently engaged in a joint venture with strategic partner in Australia to set up division in Australia. • May enter joint venture in NZ if Australian JV proves to be successful.
E	• Profitability down • Lack of team cohesion (two companies working in silos) No internal integration, did not set up right organizational structure.	• To meet customer requirements both current and new contracts. • To become global provider • To raise capital to expand	• Pressure on manufacturing division to meet new designs as well as current contract designs.

Case	Triggers	Goals	Actions
	• Lack of customer feedback into servitized products • No internal training to sell solutions • Limited resource capacity (venture capitalist - shareholder owned). Not able to raise extra capital (limited capital) • Shareholders want quick return (within a couple of years) • Shareholders not realistic about how long servitization transition takes (2 years). • Only bought operating contracts of manufacturing company, no actual assets • Not meeting customer contract requirements • Unrealistic returns forecasted • Numerous changes in CEO	• Realistic goals around length of transition and future revenue forecasts. • To fully own manufacturing part of business (assets as well as operational contracts). Little asset value	• Did not meet customer requirements both in new contracts and current contracts. Did not expand globally. • Made a big loss (12.7 million) • Couldn't afford to buy assets of manufacturing company • Shareholders lost faith and bankrupted company 2017. • Design engineers have set up new company (same service provision prior to integrating manufacturing business).
F	• Profitability down • Downturn in world economy (Brazilian market where firm is operating) • Current customers not happy with the change. Limited customer focus and integration. • No internal training to sell solutions • No internal integration. Plan on keeping divisions separate. • A lack of motivation to servitize initially (bought services company for their product) • Lack of resource capacity • Not realistic in length of time transition takes. • CEO was not clear on strategic direction of services (no employee or customer pull)	• To integrate product and services in order to sell company for an increased value. • Integrate product with data services to enable full capability of devices. • Increase workforce by employing software engineers and marketing salespeople • Increase market for servitized products.	• Sold product business to large Swiss company 2018 (they did not see the value of services because it hadn't been created by Case F). • Case F still has service business. CEO has left and has stated that he is unsure if company is going to keep the service business.

This discussion leads to the following proposition:

Proposition 4: *Firms that interlink their capabilities are more likely to achieve better outcomes in terms of (a) introduction of new products and services, (b) sustaining their performance and (c) reducing competition by establishing unique market niches.*

4.5 Linking outcomes from key mechanisms with overall servitization outcomes

It was mentioned that at the outset of the project, two firms were unsuccessful in their servitization transformation. In Case E, the firm went bankrupt during the research project.

Table 4.8 provides an overview of the three outcomes that were assessed so far and also the overall servitization outcome (for assessment of servitization outcomes, see the definitions in section 3.3.2). The findings presented in Table 4.8 demonstrate that the outcomes of individual capabilities are linked with the overall servitization outcome. In other words, achieving in terms of introducing new product/services, sustained performance during servitization transition and lower competition to secure market niches impacts the overall servitization outcome. This discussion leads to the next proposition:

Proposition 5: *Firms that achieve positive outcomes in introducing new product/services, sustained performance during servitization transition and lower competition to securing market niches are more likely to achieve a positive overall servitization outcome.*

Table 4.8: Servitization - Capability Building Performance

Case	Introduction of New Product Service offerings	Sustained performance	Level of Competition	Overall servitization outcome	Description of servitization outcomes
A	High	Average	Low	High achievers	General growth from the servitization in relation to product as well as services. Firm had some issues with transitioning mechanisms – that were later corrected.
B	High	High	Low	High achievers	General growth from the servitization in relation to product as well as services. Best performing firm (in terms of servitization success) and a firm that developed all three capabilities.
C	High	Average	Average	Potential achievers	The company had a static performance, services still in development. Focus on marketing mechanisms was lacking and this is where the firm concentrates.
D	Average	Average	Low	Potential achievers	The product arm of this firm is growing successfully. However, the firm is developing fully integrated services and currently focused on the development of collaborative mechanisms.
E	Low	Low	High	Low achievers	The servitization transformation was unsuccessful – firm bankrupted
F	Low	Low	High	Low achievers	The servitization transformation was unsuccessful. Firm was sold as a manufacturing firm – the service side of business was considered by investors as lacking value

Chapter 5: Discussion

5.1 Introduction

The purpose of this chapter is to discuss the findings. First, the findings are organised into a framework that is based around capabilities and mechanisms. The framework is then enhanced by a set of underlying approaches. These approaches provide an additional angle on the role of capabilities and mechanism in the servitization process. Second, the chapter discusses the findings in relation to the literature – inclusive of the discussion of the contribution of this study to the literature on servitization. Third, limitations are provided and linked to recommendations for the future research in this field of research.

5.2 Framework for Servitization Transition

Servitization transition is a complex process. This study has been described through a traditional process, through the lens of dynamic capabilities, which are enabled by a set of mechanisms. In this section, these findings are organized in a framework (see Table 5.1). The "Framework for Servitization Transition" is built on the capabilities and mechanisms and it is further enhanced by a set of underlying approaches. The underlying approaches provide further insight into servitization transition by pointing at commonalties in firm's approaches to servitization.

Table 5.1: Framework for Servitization Transition

	Product/Service Development	Manage Service Paradox	Securing New Markets
Objective	To create new product/services	To balance resources through the transition	To create new niches and reduce competition
Mechanisms	Collaborative mechanism	Transitioning mechanism	Marketing mechanism
Underlying strategies			
Focus on Uniqueness *Resource Based View (Barney, 1991)*	Recognition of a firm's capabilities around service quality, response and flexibility.	Working with supply chain partners to increase capacity, balancing resources and building resilience from unforeseen challenges.	Working to create a unique proposition that is valuable, hard to imitate, rare and organized making it hard for competitors to imitate therefore raising competitive market entry barriers
Employee Pull *Service Paradox Theories (Gebauer et al., 2005; Gustafsson et al., 2005)* *Institutional Isomorphism (DiMaggio & Powell, 1983)*	Ensure perceptions around the implementation of service innovation progress is high relative to goals set by management	The dependence of employee perception on observed progress means that objectives of the service innovation are seen as successful	Developing successful service business experience will entice new customers and create new markets
Intertwining and Integrating Capabilities *Dynamic Capability Theory (Teece et al., 1997)* *Coupling capabilities (Kogut & Zander, 1992)*	Building capabilities simultaneously through collaboration with supply chain partners for creation of new product/services, sensing opportunities and seizing on ideas.	In rapidly changing markets: develop skills, processes, procedures, organizational structures, decision rules and disciplines which undergird sensing, seizing and reconfiguring capabilities.	Strong dynamic capabilities are unique and build barriers for competition.
Timing – Long term perspective (creative tension) *Service Paradox Theories (Brax, 2005; Gebauer et al., 2005; Gustafsson et al., 2005)*	Management understanding that servitization requires change at every organizational level therefore takes time, research and development takes time for innovative products and services, planning for resource capacity.	Changes in cultural and structural environment. Ready to adapt and change when needed. Being agile. Realistic and long-term view particularly from stakeholders including shareholders	Experience building with strategic alliances capture new service, long term solution contracts
Collaboration/ Alliances Knowledge transfer and learning *Learning theories (Kogut & Zander, 1992; Sandholtz, 2012)*	Platforms for sharing, easy access to information and accumulate knowledge to create value added services	Creating team environments that speak the same language with a clear understanding of progress against realistic goals. Knowledge centres of excellence	Collaborative teams that are confident in delivery of end to end solutions to new markets.

Firstly, the successful firms focused on their uniqueness in developing their capabilities. This underlying approach is reminiscent of Resource Based View theory where "for a firm to

achieve sustainable competitive advantage it must have resources that are valuable, rare, cannot be imitated and organized" (Barney, 1991). For instance, in terms of collaborative mechanisms, firms recognize performance objectives (quality, responsiveness, speed of development) that customers require in new product/service offerings and accordingly develop their capabilities. If they could not provide what the customer wants, then they look to their supply chain partners to help build resource capacity and provide missing services. By forming unique relationships with their supply chain partners providing unique products and services, they also secure new markets or create unique market niches that are difficult to imitate. Case A has formed a strategic alliance which will provide a suite of products and services to domestic customers. Their arrangement has led to them to having access to overseas markets. Case E tried to provide end-to-end solutions for new clients but were unable to cater for existing clients let alone new clients. They fell behind on orders and lost contracts. They were bankrupted in 2017.

Secondly, the successful firms were able to demonstrate what services meant for the organization by setting realistic and achievable goals and creating the "employee-pull effect" (Gebauer et al., 2005). They empowered employees to make timely decisions and ensured the breakdown of group institutional norms by setting up cross functional teams that allowed for the sharing of knowledge, encouraging innovative processes (DiMaggio & Powell, 1983; Kogut & Zander, 1992). Case A, B, C formed teams that assisted in the development of new products and services. Case D employed a marketing manager when employees weren't cross-selling and needed training to work together. They are now successfully providing asset management services as a result of interdivisional collaboration. Case E and F were unable to provide a clear vision of what management wanted to achieve. Case E used a top-down management approach (push effect as opposed to pull effect) to getting employees to work to new programmes (Sandholtz, 2012). Therefore, the underlying approach is to create "pull

effect" (rather than push effect) not only in terms of employees but essential across all stakeholders.

Thirdly, the findings revealed that there are commonly held interlinked capabilities that the successful firms utilized compared to the unsuccessful ones. While Kindstrom et al. (2013) stated "there is no single best way to become service-orientated" and hinted at "path dependant characteristics of dynamic capabilities in which firms may practice differently" (Kindström et al., 2013). Our case organizations took different pathways yet a commonly held underlying pattern in all cases was a focus on integration of and interlinking of capabilities. For example, Case C did not develop and build capability around providing servitized solutions. They did implement collaborative mechanisms (customer led design) but were slow to implement marketing mechanisms (e.g. recognizing supply chain partners are required to provide end to end solutions). In unsuccessful cases such as Case E and F, they ran product manufacturing and services divisions separately so never developed over time, in fact, they lost clients and revenues. They never recognized and capitalized on the collective knowledge within the organization and certainly had not got to the stage of understanding that they needed to develop skills and resources.

Fourthly, the successful firms understood that a long-term perspective is required for servitization as there are changes to all levels of the organization. Case A and C stated had been in the process of transitioning for 10 years or more. It was made clear to all stakeholders what the process would be and the length of time it could take to achieve those goals. Also, two of the successful firms were owner operators so were highly motivated and not having to convince weary shareholders. Case E had been part of a group of incubator firms that were initially invested in by a venture capitalist and private shareholders. There was pressure to increase profits at an early stage and when that wasn't achieved (Gustafsson et al., 2005), they were bankrupted by their own shareholders. Case F service business was not seen as

profitable, so their product side of the business was sold. Neither firm understood the long-term perspective and ramifications of servitization and the management of service paradox whereas the successful firms did (Cases A, B, D).

Lastly, successful firms instigated collaborative mechanisms for knowledge transfer that created team environments that included the customer and supply chain partners. In the same way as management ensured the "employee-pull effect", they found ways of creating a "partner-pull effect" across the supply chain. An excellent example is Case C who created a knowledge centre of excellence (knowledge repository) which was a collated information base that all partners contributed to, set on a web-based programme that allowed all strategic supply chain partners to access 24 hours a day. A self-service type information centre which was beneficial particularly with the global clients and suppliers on different time zones needing access to information at all times. Unsuccessful case studies such as E and F had not achieved this within house, let alone with strategic partners across supply networks.

5.3 Contribution to the Literature

Servitization literature has been growing exponentially since the nineties (Baines et al., 2007). A number of state-of-the-art literature reviews were written on servitization (Baines, Lightfoot, Benedettini, & Kay, 2009; Baines et al., 2017). These reviews describe the field of servitization as maturing yet also point out at numerous areas that require further research. One of the underdeveloped areas is the servitization process (Baines et al., 2007). This study addresses this gap and in particular focuses on firms' sustainable during the transformation process. The study also addresses the call from Baines et al. (2017) to address context, process and content of transformation (Baines et al., 2017). To this end, the study determines key mechanisms of servitization, key capabilities and links these to servitization outcomes.

The study identified a set of capabilities and mechanisms. Some of the mechanisms were discussed in servitization literature (or general literature) in different contexts. For instance, customer centric design is often discussed in operations strategy literature (Hayes et al., 2004; Prakash, 2011) and motivational leadership appears as an important mechanism in several servitization studies e.g. (Oliva & Kallenberg, 2003).

Our study led us to conclude that the capability product/service development consisted of **three collaborative mechanisms**. The first was *motivational leadership* where leaders look for ways to create a vision and establish an appropriate organizational culture and incentive system that will promote innovation (Augier & Teece, 2009; Ettlie & Rosenthal, 2012; Oliva & Kallenberg, 2003; Sandholtz, 2012) , *customer centric design* where customers are included in the early stages of research and development process and the focus changes from transactional to a relationship based collaboration (Hayes et al., 2004; Kogut & Zander, 1992; Oliva & Kallenberg, 2003; Wong et al., 2012) and creating decentralized *cross*

functional teams with shallow management hierarchies and decentralized authority so decisions can be timely (Ettlie & Rosenthal, 2012; Kogut & Zander, 1992; Oliva & Kallenberg, 2003; Sandholtz, 2012; Teece, 2018).

The second capability identified was in managing the service paradox - **three transitional mechanisms** were described as needing to *employ a flexible business model* where management anticipates and reacts to minimize potential resource bottlenecks and ensure resource capacity (Amit & Zott, 2012; Gebauer et al., 2005; Oliva & Kallenberg, 2003; Teece, 2010, 2018; Visnjic et al., 2016)*; develop and acquire new capabilities for services* by training existing employees or hiring or acquiring service skill sets to counteract the dominant culture around products (Bustinza et al., 2013; Prakash, 2011); *and implement the employee-pull effect* where employees are committed to goals set by collaborative project teams. By not having realistic goals will negate the progress (Brax, 2005; Gebauer et al., 2005; Gustafsson et al., 2005).

The third capability is in the ability to secure new markets. **Three marketing mechanisms** were identified as: *leveraging reputation* by working with existing customers to build up service experience where the provider builds up selling and marketing expertise (Oliva & Kallenberg, 2003; Roth & Van Der Velde, 1991), the adoption or *securing of contracts* with customers; entering into contracts in wider markets (Oliva & Kallenberg, 2003; Roth & Van Der Velde, 1991) a*nd developing a network of suppliers* who the provider has formed strategic relationships with supply chain partners in order to provide unique servitized propositions for customers and capturing value (Hayes et al., 2004; Johnson & Gustafsson, 2003; Oliva & Kallenberg, 2003; Prakash, 2011; Wise & Baumgartner, 1999).

However, what is unique in this study is bringing the capabilities and mechanisms into a holistic framework of servitization transformation. Servitization literature offers contrasting views on the servitization process. For instance, Barnett et al (2013) study found that firms

"did not appear to have adopted a holistic strategic approach to service implementation but responded to a difficult business situation and directly moved to providing availability contracting by utilizing their existing organization" (N. Barnett, Parry, Saad, Newnes, & Goh, 2013). This is different to Oliva and Kallenberg (2003), who advocate for a step by step process perspective which is seen as being a more progressive approach to servitization transition. In this study, manufacturing firms needed time to operationalize the employee-pull, build resource capacity (Gebauer et al., 2005), capabilities, knowledge and know-how (Kogut & Zander, 1992), build teamwork, developing network relationships (Johnson & Gustafsson, 2003) to remain sustainable. In contrast, not respecting step-by-step approach led to servitization and business failure (Case E).

Therefore, **the first contribution of this study is to further enhance understanding of servitization process.**

Researchers advocate that there is to be further understanding of the transformation of capabilities in the context of manufacturers (Kowalkowski et al., 2017). The study therefore addresses the content of transformation state (Baines et al., 2017) content that deals with "the effect or outcome of the process". To the researcher's knowledge, there are limited studies considering the content of transformation in the context of successful and failing firms. Benedittini et al (2015) studied the link between the "presence of a service business leading to a greater number of bankruptcy risks for the supplying firm" (Benedettini et al., 2015). They conclude it is because of internal risks both from the demand chain and product support services but are not specific. The study was empirical in nature and researchers were encouraged to further make an assessment as to the type of risks to validate their conclusions. This study delves into the type of commonly used mechanisms and capabilities (or lack of) for successful and unsuccessful servitizing firms.

Therefore, **the second contribution of the study is in considering 'successful' and 'failing' attempts in servitization.**

Longitudinal perspectives are often encouraged in management studies (Eisenhardt, 1989; Miles et al., 2014; Yin, 2014). Servitization researchers support that more understanding is needed in terms of a longitudinal approach exhibiting a developmental approach to capabilities (Kindström et al., 2013; Kowalkowski et al., 2017; Oliva & Kallenberg, 2003). This study examines the impacts of key mechanisms in developing capabilities over a period of three years. Therefore, **the third contribution is a longitudinal approach to developing capabilities in servitization.**

Several perspectives are used in servitization literature as theoretical underpinnings for research. Studies are often grounded in Resource Based View (RBV) (Coreynen et al., 2017; Kanninen et al., 2017); and dynamic capabilities in servitization by identifying the key microfoundations related to service innovation in the manufacturing context and provided empirical evidence of dynamic capabilities in the development phase of case companies service business (Kanninen et al., 2017); identified key microfoundations (Kindström et al., 2013); development of capabilities with another partner (Raddats et al., 2017); and an outlook on dynamic capability configurations through digitization (Coreynen et al., 2017). Our study is grounded in a longitudinal context of the development of capabilities and underlying strategies in developing dynamic capabilities in firms. Therefore, **the fourth contribution of this study is further application of RBV and dynamic capabilities theories in the context of servitization over a period of three years.**

The study concludes that these perspectives are useful in determining the successful transition. Indeed, firms build unique capabilities to stay competitive and to stay sustainable during the transformation. However, these perspectives are less precise in depicting the failing attempts. Our study details varying degrees of successful and unsuccessful firms. There is a

firm that has been made bankrupt during the period of this study due to a lack of resources and unrealistic expectations of short-term profit targets. Another firm has sold their product manufacturing unit to another manufacturer who did not acquire the service division as the servitizing firm were not making a profit therefore servitization was viewed as not having been successful. The successful cases are all at varying stages in implementing mechanisms and capabilities during the servitization transition. Two cases have been successful. They each have used collaborative, transitional and marketing mechanisms for servitization and consequently have increased revenues. Two firms are in the early stages of servitization are in the process of implementing collaborative mechanisms. There is a tendency in large product manufacturing firms to standardize processes and products to maintain efficiency. Service innovation as a learning environment requires organizations to be responsive and flexible in structure; culture and output in order to adapt to change. Management should motivate groups of employees and other stakeholders to work together to integrate new service capabilities and provide a platform that enables them to make timely decisions and create value added services.

5.4 Limitations and Future Research

As with most studies, this research is not without limitations. The research is based on six businesses studied over a three-year period from 2015 to 2018 for the purposes of developing propositions for future testing. Our cases vary in the length time it has taken to develop capabilities and servitize. Some of the firms commented that servitization had taken longer than expected and mentioned time periods up to 10 to 12 years. Future research could consider a longer period to study the transition due to servitization generally taking longer than three years to implement. Also, it would be good to revisit the successful firms in this study to monitor servitization progress. As the servitization progresses and supply partnerships are created and implemented, it would be of interest to understand the outcomes

of such strategic contracts, therefore interviewing supply chain partners in the future would ascertain how successful or unsuccessful these contracts are in relation to all of the supply chain partners including the customers.

The qualitative research focuses on manufacturing businesses whose headquarters reside in New Zealand, however as it was found and compared to other studies, these companies have similar traits to other business firms choosing to servitize in a competitive global environment. For New Zealand, there are geographical inclined considerations to consider, one being in assessing how close to locate to one's customer to instigate value-collaboration.

While we have recognized theoretical implications from literature such as Dynamic Capability and Resource Based View theory being applicable to a business perspective, and this has support from the case study findings, there may be other theoretical lenses in other fields which to observe the evolutionary paths of servitization. Also, this study found that the mechanisms and capabilities develop concurrently over time, it would be interesting to research whether there are capabilities that develop consecutively over time and whether this leads to more servitization success.

Further investigation could be completed looking at the differences in types of ownership of firms. There is a lot of pressure on privately owned firms with shareholders who want a quick profit compared to owner operator firms who do not have the pressures of shareholders but have limited investment capital. It would be interesting to understand if servitization success is influenced by type of ownership structure and financial backing. One of our failed firms was affected by unrealistic shareholders needing to see quick profits.

More generally this study can be used for future research in studying dynamic capabilities in servitization not just for manufacturing businesses but to the wider business

community thinking of entering into the services market to see if there are similar developing mechanisms and capabilities.

Chapter 6: Conclusion

Researchers conclude that there is a lack of studies that monitor the servitization outcome and the development of dynamic capabilities over time (Kindström et al., 2013; Oliva & Kallenberg, 2003). The research question raised at the beginning of the study was the following: How do manufacturing businesses remain sustainable during servitization? Researchers stated that there seemed "no single best way to become service orientated and hinted at path dependent characteristics of dynamic capabilities in which firms practice differently in terms of sequence developing different sets of capabilities" (Kindström et al., 2013). This study commenced with six firms that were at various stages of servitization transition. The findings suggest that there are commonly held interlinked capabilities that successful firms utilized compared to unsuccessful ones.

Firstly, firms who proactively used collaborative mechanisms were likely to successfully introduce new product service offerings. These collaborative mechanisms were identified as motivated leadership, customer centric design and decentralized cross functional project teams.

Secondly, firms that proactively manage the service paradox are more likely to sustain firm performance. Key transitional mechanisms were employing a flexible business model, acquiring new service capabilities and ensuring an employee-pull effect.

Thirdly, firms that secure market capability are likely to face lower levels of competition. Key marketing mechanisms were leveraging business reputation, securing new contracts and developing a network of strategic suppliers. Case studies took different pathways yet a common underlying pattern in all of the cases was a focus on integration and interlinking of capabilities.

This led to our fourth proposition that firms that interlink their capabilities are more likely to achieve better outcomes in terms of the a) introduction to new products and services b) sustaining their performance and c) reducing competition by establishing unique markets. An overview of the three outcomes that were assessed, and these were linked to the overall servitization outcome. The findings led to the fifth proposition that firms that achieve positive outcomes in the three capabilities (a, b and c) are more likely to achieve a positive overall servitization outcome.

Of course, this study is not necessarily just for manufacturing businesses but could be applied to the wider business community thinking of entering into the services market to see if there are similar developing mechanisms and capabilities. Given that this research has adopted a pragmatic focus on strategic practice and practitioners it can be assumed that there would be benefits for managers in understanding the findings around transitioning to a servitized model. The contribution of the research is identifying key mechanisms and capabilities which is further enhanced by common underlying approaches used by the case study organizations, the researcher providing a servitization framework that could be a starting point for some firms who are planning to servitize. The first commonly identified approach was that successful firms focused on their uniqueness in developing their capabilities. This is reminiscent of the Resource Based Theory approach and their developing and interlinking of internal and external capabilities such as described in the Dynamic Capabilities Theory. The second most commonly identified approach was that successful firms instigated the employee-pull effect which empowered employees to make timely decisions and breakdown of group institutional norms. The third approach was that there were interlinked capabilities that the successful firms utilized.

Fourthly, the successful organizations took a long-term perspective to the transition because of the large amount of changes that took place and a realistic approach to how long

goals would be achieved. Lastly, that successful firms more commonly instigated collaborative mechanisms for knowledge transfer by creating team environments that included the customer and supply chain partners.

These underlying actions of course require regular information sharing sessions and resource exchanges which can be seen as leading to dependence on the relationships. Still, the key insight is that despite some lacking initial resources, the successful firms have the ability to engage employees and supply chain partners to create products and services and create a unique market and industry structure for themselves to achieve dominance. This ability rests on the clever use of collaboration creating employee-pull and partner-pull effects.

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Appendix 1: Human Ethics Committee Approval

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2014/47

23 June 2014

Julie Donovan
Department of Management, Marketing & Entrepreneurship
UNIVERSITY OF CANTERBURY

Dear Julie

The Human Ethics Committee advises that your research proposal "Innovation in high technology manufacturing - investigation into the transition of product centric to a product/service portfolio" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 20 June 2014.

Best wishes for your project.

Yours sincerely

Lindsey MacDonald
Chair
University of Canterbury Human Ethics Committee

Appendix 2: Participant's Invitation for Research Study

Hello ……

My name is Julie Donovan, and I am an adult student currently studying towards a PhD in Management at University of Canterbury, in particular Operations Management. My supervisor is Associate Professor Pavel Castka. I have contacted you as I feel your company is the perfect candidate for the type of research I am wanting to conduct for my PhD. I was wondering if you wouldn't mind sparing me some time to discussing "company name" integrated service and manufacturing model.

The background to my research began by reading the New Sector Report from MBIE 2012 and 2018 and one of the themes that emerged was around the need for NZ manufacturers to develop business models that integrate service offerings with goods to create competitive advantage. I know this is not a new concept, but I am wanting to look more at "how" some kiwi firms have achieved this. Particularly as product manufacturers have tight technological discipline and culture around key products. To then need to look at incorporating a customer focussed valued added service attached to their product interests me as it incorporates different capabilities.

So, if it isn't too inconvenient, would you possibly be able to spare me at least 60 minutes of your time so I could ask you some specific questions around my topic. I can send these to you if you are interested in meeting with me. It will be completely confidential of course. I am Christchurch based; I just happen to be in Auckland on Friday 23rd October so if that was convenient to you how would a time between 9.00am to 3pm suit? Otherwise we can conduct a phone interview at a later date if that is better. It would be great to come out and meet you face-to-face.

Kind Regards
Julie Donovan

Appendix 3: Case Study Backgrounds and Interview Summaries

Case A

Background

Case A is a technology communications company with headquarters based in New Zealand (NZ) and 17 offices worldwide. The company develops voice and data radio technologies, exporting about 95% of products from its NZ manufacturing base. Customers include London Buses, Country Fire Authority and Basin Electric Power Cooperative. Competitors include Motorola, Harris Corporation, E.F. Johnson Company, Raytheon, HYT, Selex and EMC spa. The company is privately owned and has a charitable trust structure that states that the company must remain in NZ which allows a flow of dividends which feeds back into NZ and the ICT sector. In 2016 the revenue was $175 million and 600 employees (TIN, 2016). The company delivers and manages communications solutions that support the operations of utilities and public safety organisations. Some of its products include two-way radios, network systems, public safety solutions, utility solutions, urban transport solutions. They are involved in various research think tanks around NZ. Locally they partner with the University of Canterbury and the technology hub based in Christchurch.

2015 Interview

The path to servitisation commenced near 2009, when the company realised that it couldn't compete on standalone products due to mass production in Asia. They recognised that technology leadership and competing on lowest cost in the electronics sector in NZ was not competitive on a global scale due to size of the company and their scale of production.

"Hardware can be relatively easily commoditised e.g. mobile phones, Nokia has been a classic example, right at the top 15 years ago, but the market has commoditised and effectively the brand wasn't sufficient to be able to carry them through, so you don't want to be competing on the basis of lowest cost in NZ"

They were heavily investing in research and development at 15% of their revenues. Their knowledge around designing networks came naturally because of being in the business of selling infrastructure and equipment. Therefore, there was an existing design capability within the company, and they could rely on their own equipment, not third party. After discussion with some of their customers who had enquired about the possibility of outsourcing to Case A, they identified a future market opportunity in the public safety sector i.e. added value potential of services such as design consultation and data analysis. Until recently, they had been giving away to their clients as add-on features to their products. The potential in the future was the ability to have a steady, sustainable ongoing revenue stream as opposed to large one-off project revenue.

"We started getting into an area we knew a little bit about but not a great deal…and that is maintenance and support…that was something we knew a little bit about for our products but not a lot for a partnership-based solution."

They formed a project team of about four or five people from various departments within the organisation, exploring what it meant to be providing services. One example was their ability to provide dispatch service via a dispatch console which provides a vital link between dispatchers and field personnel, helping to coordinate field response and ensure the safety of personnel. The dispatch console accesses the radio system through an IP (Internet Protocol) network, making it possible to operate through a local network or from anywhere in the world. In the utility sector, the customer can lose their annual profit in a couple of days if a big capital asset fails that is a huge expense for them. The ability to

date all the SCADA[2] data and monitor trends means "when a large substation transformer is going to come close to overheating on several cycles, it's preventative maintenance rather than reactive maintenance". Customers could see what SCADA was providing and realised it was too costly for them to enter into the software analytics area, so they looked to the system suppliers to provide the added capabilities.

"the customer is trusting you with the competencies they once had, they are outsourcing all of the information and risk to you. They need to be sure they're doing the right thing. Therefore, the ability to be able to see the people, know them, trust them, is extremely important".

This initial discussion with customers was promising and as a result they launched a separate services division along with a general manager. This change meant a restructuring of the company and upskilling employees into service-related areas. They had great customer relationships which gave them the platform to collaborate on the possibilities of a servitised solution.

"Product supply relationships previously had typically taken place at a procurement level now there was a whole new cross-level of relationships with the customer that involved the CEO, even the Board, which were never there before".

When a company moves towards developing a partner-based solution, there is an opportunity to look at all sorts of related competencies which "you wouldn't build at all until you find great partners to work with". They recognised that there was a strong element of partnership required and that any manufacturer typically does not have many partnerships due to the confidentiality around market and product information.

[2] Supervisory Control and Data Acquisition - Supervisory control and data acquisition (**SCADA**) is a system of software and hardware elements that allows industrial organizations to: Control industrial processes locally or at remote locations. Monitor, gather, and process real-time data.

“We had the opportunity to offer a turnkey provision; a complete solution for a customer and then their risk is lower, they don’t have to employ additional related services and you take the full accountability for the delivery of and the ongoing operations of the project”. Total services now account for a 25% of Case A’s revenue (TIN, 2016) up from 5% in 2013 . Services are broken into the profit areas of design (consultancy), deploy(install), support (maintenance) and managed services which is the services related to customer operations such as managing call centres 24/7.

In hindsight, the recognition of partnership-based solutions was the easiest part to the transition. It would be the implementation that was the hard part for the organisation to manage. Case A underestimated the level of time and investment and risk because “there is a tendency” to operate in the same way and with the same relationships as before.

“Essentially it takes a decade to get this going…but that doesn’t mean you spend nine years thinking about it and then doing it in one year…or putting your processes in place for nine years and then doing it”.

They invested a lot in the new “services” division of the business. The telecommunications industry has a global size of $5 billion annually. Case A’s revenue is $200 million which represents 5% of the total global turnover so they observed a lot of room to manoeuvre in the market sector. The initial strategy was “let’s build it and see what happens mentality” and there was large investment.

They believe the best margin of profitability is when a company can upscale products and services to the marketplace. To achieve this must they needed to narrow down and become specialists within a niche (with the adage you can’t be everything to everybody). As a result, Case A specifically targeted public safety agencies and utilities. It was a big risk for the company to build the services division outright and expect that work would follow. In hindsight they would have wished it could have been more incremental.

“one can choose to take more of an incremental approach, rather than a build it and work will all come…that would have probably been a bit easier”. Whereas IBM acquired PWC consultancy where they bought in the skill. So, it’s not uncommon for a company getting into services to acquire that track record and credibility instead of building it within. However, on the flipside it might be easier in some ways to start it off in your own company because at least then you can instil your values”.

Case A’s initial service proposition was managing a large customer organization’s network. The challenge was that the customer had traditionally owned and operated their own networks. Case A had built up a trusting relationship with the customer on previous projects and shown that they were competent in what they were doing they allowed Case A to look after and manage their network. They used this as a prototype to develop other managed service propositions with existing customers. Case A grew their service business by including the customer for brainstorming sessions where solutions are created by thinking “outside of the square”. Then Case A will move it into the design phase to make it happen. The challenge was at the same time they must maintain business as usual. To achieve this they conduct rapid prototyping, conceptual design, to make it tangible so that the customer will be comfortable to invest in the new service before it is case-hardened. This only comes from building up long term relationships with trust with existing customers.

Case A has recognised that a challenge is that services can have relatively minimal margins, the worst thing to happen in providing services is the perception that a company will take total responsibility and deliver it back to the client for less than the cost of you doing it which is disastrous for the solutions provider.

“If you can get to a model like we have with one of our customers (which is a public safety organisation) where you have people embedded into the organisation co-creating,

we are actually delivering new value almost on a day to day basis rather than outsourcing it at a lower price".

This is the beginning of a new collaborative way of working. "The first step is to define what a service is and when there are 300 engineers, typically they won't have a comprehensive understanding of what that is". The product culture has traditionally been about features and performance, as opposed to outcomes as with a services culture. Not because they necessarily don't want to, but because they haven't got the experience. "There needs to be a complete culture shift in your relations to become far more customer service and experience oriented".

2018 Interview

Case A had continued to recognise the importance of service solutions to increase overall revenue. It was also mentioned that it was also a defensive strategy to overseas competitors looking to enter into the market sector in NZ. Unfortunately, the transition to services meant profitability was declining.

"We've had to back off a bit in terms of investment in that managed service area. There's still a service function but it doesn't have the fuel and spotlight on it as it did when we last talked".

In 2016 the revenue was $175 million with 600 employees (TIN, 2016). In 2018 the revenue was $171 million with 571 employees (TIN, 2018). They had been investing the capital from their "run rate business" (product business) which was still very profitable into the services expansion. They hoped that services would make an earlier profit, but this did not happen, and in fact, there was less margin for their service work than their product sales.

"We typically don't expect as much margin from the services business as we do from the product business due to the intensive labour effort in getting the services up and running".

Case A "retrenched and refocussed" to deal with some servitisation challenges. Firstly, they realised that if they did not reinvest the run rate profits back into their product division that the company would more than likely fail in the future. They did recognise the value of services but not at the expense at what was a very successful business up until now. So, in order to protect the business that they had been in for 50 years, they looked externally to the marketplace to understand how they may finance the investment needed in the services part of the business.

"We are about to allow a third party to take a 40% stake in this company and inject a whole bunch of capital. So, it's a fellow industry player that likes what we are doing".

This meant thinking outside of the confines of the current organisational structure of the trust ownership of Case A, to sell a minor stake to an outside investor. This new organisational structure of trusts, external minor stake ownership and external partnerships would enable them to fund development of services and expansion both domestically and internationally. "The existing ownership trusts would be entitled to dividends while capturing a business partner may boost company fortunes"(Hutchins, May 2018) .

As mentioned previously 77% of their total business portfolio was product based and 23% is service based this ratio hasn't grown in the last 3 years. In 2015 they had been hoping to achieve a 70/30 ratio of products to services in 2015 as a future goal. Managed services make up 20% of total services revenue for NZ and 10% globally. They have recently partnered with another large NZ enterprise company who aligns with their business philosophy and vision.

"More of our customers are looking for solutions that span across both our traditional and mobile communications……so we will put together a design, deploy, support services and maybe some managed services in there as well along with our partner".

Case A had been pursuing them for 10 years and finally in 2017 they joined forces to provide a solutions-based platform where the opportunity to provide added value propositions may emerge. Case A has stated that they will be able to individually tailor a bundle of services to each client needs. These add on services will mean increased, steady revenue for the company but also taking on the risk for the customer.

"If you are a utility and you do not deliver, you have a number of key performance indicators reflecting levels of service, there will be downtime if you have not kept up the maintenance of your network that creates power outages and as a consequence receive massive fines".

The business divisions monitor and set products and services targets monthly, quarterly and annually based on measures such as number of orders, total revenue, profit margin, percentage of market revenue and market share. They were collecting data on customer satisfaction through a touch point analysis called the Net Promotor Score[3], but they have temporarily ceased collecting data as they concluded that this was distracting them from meeting their financial and operational target. Both services and product groups still operate as separate divisions of the company. They have sales incentives targets to work to and reporting on these are worked on as unified group. This helps in ensuring the teams look at targets from a holistic company view rather than a divisional one. Case A are currently meeting targets on a quarterly and annual basis. They also continue to develop their service solution platform by developing SCADA networks, and research and development into their use of the Industrial Internet of Things (IoT) who are on a "massive growth curve as they picked up some larger deals in North America". The future growth areas for the company will remain in the Public Safety sector.

[3] Net Promoter Score - measures the willingness of customers to recommend a company's products or services to others. It is used as a proxy for gauging the customer's overall satisfaction with a company's product or service and the customer's loyalty to the brand.

Case B

Background

Case B was founded in 1992 in Christchurch and is part of a consortium of companies which together work to function as a global medical group committed to the design, manufacture and distribution of high-quality medical devices in a speciality area. There was significant growth for the company. This attracted investment from a large global medical devices company which assisted in refinancing a large amount of the group's debt as well providing a stronger sales channel globally and equity funding. The NZ company grew from having 20 staff to 38 and has a turnover of approximately $5 million. The Christchurch based head office houses its design, quality assurance, regulatory, marketing and administrative functions as well as manufacturing. Their team is made up of highly skilled employees who lead research and development solutions. They are one of two approved manufacturers in the southern hemisphere who will complete the design and regulatory paperwork providing end to end solutions for their clients. Case B state that the NZ location provides benefits in that it gives them the chance to look at problems without being constrained or observed by others in the marketplace.

"NZ's location offers an ability to think outside the box and it makes it easier to sell across a wider range of markets. The problem with the competitors in the U.S, by default they seem to all be doing the same thing because with a population that big it just ends up having the same product or service".

Case B mentioned that NZ is not without regulation, but it does not have as onerous regulation requirements as other countries. However, Case B chooses to operate to international guidelines and standards to attract overseas clients.

2015 Interview

The decision was made early to become a medical device company and jettison all work that wasn't attached to the medical industry. Soon afterwards Case B realised that there had to be a depth of product or knowledge in a medical speciality to gain competitive advantage otherwise the market was too broad and there was a possibility of "spreading ourselves thin across a broad market". The decision was to focus on a speciality niche in the medical product industry. Firstly, they provided contract manufacturing work…which provided a specific need to their clients which weren't being met by larger corporations in Europe or the US. It was initiated by the fact that larger suppliers in the industry weren't meeting the timely delivery of goods. Requests for work progressed to more design work, so the company began designing and manufacturing they product for the customers. Trust and loyalty were growing between client and supplier, the client could see Case B's capability in being able to provide a more specialised product. They were now completing all the pre-regulatory requirement, as well as designing, manufacturing and the regulatory sign off for the product representing an "end to end" solution. There are only a few companies in the world that provide the end to end bundling of products and services, the design, regulatory, quality assurance and manufacturing in this market.

"For customers they observed what the market was providing was a half sell…it's like saying I'm going to sit down with you and design this for you…now go and find someone to make it for you. The customer does not want to do that as they think you were taking care of that…. we started to develop a real skill set for doing hard things that other people don't want to do."

Case B were growing very close to their customers as they became to form part of the research and development team of major customers. This type of work they labelled as "bespoke manufacturing".

“We work really closely to the point that the clients will know the individual designers by name, and I would know most of their wives/ partners birthdays”

Case B were now creating a “third string to their bow” by providing their own signature product range including design and regulatory work completed, and to sell these products to the general medical market. The acquired knowledge was from the bespoke manufacturing learnings. “Bespoke manufacturing work is the arrowhead to getting other business but only provides 45% of the revenue”. Margins are lower. Case B state that they will maintain bespoke work because it initiates other type of work including their signature products where the company sees the investment and the growth happening in the future.

“We’ve got a large enough client base now so longer rely on having few clients. We need to get these customers generating more revenue but that’s fine. If you look at where we are putting our design resource, at the start of this year (2015) …we were spending 12% of our design time on supporting contract manufacturing, 5% on signature product and the rest was bespoke (83%)”.

Case B had to change their strategic focus from only selling products to selling the solutions which meant a cultural change as well as a structural one.

“I was fortunate in the fact that I was an engineer…and the first time the company employed a marketer was a fantastic general introduction to marketing because she approached it in a way that wasn’t offensive to our engineers…she didn’t make us go ‘No…..’ because the traditional engineering approach is to go that’s the fluffy stuff to make it look shiny and pretending to make it sell whereas we design it so good it will sell itself”.

Eventually the marketing manager left and someone from an engineering background took on the marketing side of the business.

"After she left, we all went dark on marketing and then over time sales and marketing has become my role, mainly through knowing the clients the best, and probably being the one that's prepared to make the shift".

There was a recognition over time that there were different capabilities involved in their work, recognising that there was contract, bespoke and signature manufacturing and that clients required different services.

"Because prior to that we were just doing jobs. And we probably weren't differentiating between a contract manufacturing job and a design job. We knew we did design activity and when we were doing one or the other, but when we were talking to a client, we weren't breaking it into three components".

Case B customers are typically engineering managers or product managers, their budgets do not provide a consulting component to their pricing. They currently factor the price of the services, design, regulatory as part of the overall product sell. In a bespoke sale they generally aim for a 50+% gross margin, signature is a 60% gross margin.

"To be competitive as a contract manufacturer, even on the tricky hard stuff, anything above 45% gross margin gets tricky for volume stuff. If it's really niche… (like one surgeon who I've designed an instrument for) then you can charge an absolute premium for that and the client is happy to pay that for it because they rationalize it, they really want it".

The risks in doing business mainly come with contract manufacturing. With a contract manufacturing job if the customer does not like the way Case B performed, they can go to another competitor contract manufacturer. Bespoke manufacturing has less risk because when Case B is selling a product it must specifically design, the customer has invested in that product which limits their desire to work with another competitor.

"We're not giving them our design, its design by collaboration. It's our regulatory package, our quality package…they're much more tied to the arrangement but there's a

much higher investment. You can only sell it to one person and there's a chance the relationship can go bad occasionally. But they can also go well – it goes both ways".

But by adding the signature line product Case B are identifying needs and trying to create a product they can sell to multiple companies therefore increasing profitability through higher margins. The growth and investment in the signature range is where the company its future.

2018 Interview

In mid-2017 there was a change of ownership from U.S backed to 100% NZ owned. The As part of the new plans, the company has moved to a newer, larger facility which has been a positive move for the team. In 2017 they refocussed and have a new strategic plan which details the important aspects for the company such as ensuring that they have stable foundations, world class facilities, world class systems and world class people. This part of the process is nearly complete in terms of building the team and the system and how people will interact systematically is the next phase of their journey. Step two is to improve profitability by focussing on, monitoring and measuring it.

"That comes through product mix and price selection with proactive sales therefore improving marketing sales pipelines. Profitability and marketing sales go hand in hand, the better you forecast your marketing and sales, this helps production make better decisions".

The next strategic step for the company is to concentrate on product development (R&D). They will focus on adding new innovative products. They see this as "transforming technology" therefore allowing for opportunities for new business. They define this innovation as 'data that informs'. "So, for example a company like Formway invented the life chair but what they do now as a company is sell their ergonomic data". Formway sell the data rather than the physical product. Case B isn't at that stage of the

process; however, they do not know what the future holds in that direction. They recognise how important it is for a patient to not only have the surgery, but to identify the rehabilitation process as an important part of improving the patient's physical outcomes. "If you could get your patient to rehabilitate to do some exercises and strength improves, they will rehabilitate faster post-operatively and get better results".

The company is looking to create technology that can analyse a patient's ability to monitor where and when they need to address these issues.

"From an insurers point of view in the US, they're not going to do a procedure on a patient that isn't going to rehabilitate well. They can defer or manage spend better, based on data. This is an example how you take a dataset and start monetarising it".

The future could include putting sensors into the product, but now it is more about working with the surgeons to obtain better feedback, "the better the data, the better the feedback". Whether this improves the outcome of the patient is unknown.

In 2015, there were three components to the business. They were contract, bespoke and signature contracting. Contract manufacturing is growing but they are wanting to keep contract work to a minimum as it has lower margins. They need to direct their resources into higher margin work such as bespoke and signature. Even bespoke has been deemphasised in favour of growing the signature product. It has the largest margins of the three and what they have recognised is that they can realise those margins. "In 2015 signature product was at 3% but is now at around 24% which is a big jump". They are pleased but would be happier if it was being executed a lot faster. Margins are currently 50% for signature which is not what they aimed for 60% in 2015. Overall company profitability is up 38% from last year.

The company has been constantly accelerating by increasing employment, another deployment occurring next year (2019). They are also changing from actively selling to existing customers to selling on the general market.

"We were selling it to customers we already knew and had a relationship with, through their contract and bespoke work, what we know is we are not getting to a lot of other customers that we know are out there, so the goal is to get to them".

In the last couple of months, the company has expanded to Australia. They plan to have a similar model setup to NZ but with more touch points i.e. being more present in the market. There are more regulations in Australia, particularly for more challenging devices. And, they will be exhibiting for the first time at the largest trade show located in Las Vegas, United States. It is a significant step in having something for the customers to observe and the company has been working very closely with NZ Trade and Enterprise to try to gain distributors that they hadn't previously in the general market. The current US regime is encouraging U.S manufacturers to produce at home so they are consuming more raw materials now there is more global demand and prices are 25% higher worldwide. The level at which the NZ dollar is trading, an advantage is that the company is making more margin on those sales than what was expected. While the competitors are battling for work, Case B are choosing what work they want because the competitors don't provide the end to end solution for the customer.

"For a company our size we have 5 people doing the regulatory work, you can't monetise that, it's just paperwork but it's what enables us to bring opportunities in. You want the product after four and a half years of trying? We'll provide to you by Christmas".

If the company didn't provide the other elements to their package such as the regulatory compliance, then they would not be able to compete on price with their competitors particularly from the Middle East and Asia.

Currently the company are not measuring customer centric key performance indicators. One challenge is that their customers are requesting to unbundle the services however it is not profitable for them to do this, so they are having to turn customers away. As mentioned, they have wrapped the services component around the product to create

opportunities, this is where the growth is. “This month we will take delivery of a million dollars of new plant and we will need to employ more manufacturing staff”. The future for Case B is also in licensing technologies that they have brought into NZ to then sell back into the global marketplace to increase signature product revenue.

“We are not selling a thing; we are selling a complete package”. We have applied all our knowledge onto that signature product, differentiating it from others”.

The company’s knowledge about what works best from a production standpoint, helps with quality etc, these are the important to their customers. Their opinion is if the manufacturing is removed then all you have is design work which makes smaller profit margins and the “knowledge and experience with things that differentiate are washed away”. These companies are now bringing work to Case B because product quality from overseas manufacturers is poor. Profitability is up, the company which once boasted $5 million annually is now projected to be in the $20 to $30-million-dollar bracket in five years’ time.

Case C

Background

Case C manufactures steel frame systems and operates an integrated service and manufacturing model. The company was founded in 1987 and is based in Auckland, New Zealand. It has approximately 95 employees. Their frame system is a modern method of rapid, quality construction using light-gauge steel framing. An end-to-end design and build solution, the frame system is designed to suit a wide range of projects that demand the rapid delivery of quality buildings. They have established themselves as a global innovator in building design, software programming, detailing, engineering, manufacturing and delivery. The business has local teams on the ground in the Americas, Asia, New Zealand, Australia and the Pacific, the Middle East and Africa. Based in

Auckland, New Zealand, their head office houses their senior leadership team, the New Zealand and Pacific Islands sales team, finance team and human Resources and IT teams. The location also provides worldwide logistics support for New Zealand, Australia and the Pacific. Revenue in 2016 was $60 million (TIN, 2016).

2015 Interview

Case C originally was a privately-owned product manufacturing company selling machines and materials. Later they bought in software design capability from a third-party partner that enabled their design process. They were eager to bring Intellectual Property (IP) into the business that would add value to their business because their current market position was threatened because "building a machine can also be made in Taiwan or India and then cannibalised by low price competitors". Case C had a close relationship with one of their design partners for 10 years and took the opportunity to acquire the company when the previous owner retired. Following that acquisition, they also acquired an Australian software company who provided software for computer modelling and engineering, structural design and analysis. The evolution from a product manufacturer to becoming a servitised company occurred over a 12-year period.

"By now also the customers and clients were demanding it.... they were only wanting to deal with one company. The key to our marketing position is both our value offering but also our service offering.... we are adding know-how and describe it as one phone call solution".

Case C operates as an integrated service and manufacturing model, services include the design and software programming around the product. By working closely with customers and strategic partners (who were software engineers), they recognised that the design, software programming and service element was an integral part of their ongoing business and that they could provide an end to end solution for their clients. Case C

believes their future is in the software, by enhancing the business automation, service of software and know-how, they need to employ staff that can consult and advise clients. Currently the company offerings are made up of approximately 15% services and 85% physical product. Case Care wanting to increase services to 30% where they believe is the company meets a critical mass. The next step is to start scaling out the services to the marketplace

"The aim is to obtain a service offering of 30% and then we are making a profit from it …therefore we need to look at market forces, understand people's capabilities….and how to industrialise those services".

The company next move is to provide customers with an online software solution i.e. the know-how to deliver a design process; to automate engineering standards globally and provide manufacturing efficiency in business automation.

"If someone comes to us as a new venture…. they may not even be in the construction sector……so for us that perspective is a Greenfields project. A client might be a property developer who wants to purchase the manufacturing capability or design capability. Or they want to use the smarts in the software, so they pay to use it".

If the customer buys the licensing and software technology, they can progress from being a beginner user to intermediate to advanced user. In Dubai recently they held a software training workshop.

"Existing customers who have our existing platform need our updated platform….some of those guys have 2-5 years' experience, they use our system, rather than us use our system for them….we are basically enabling them to use our technology…….after that we are able to do best practices training on site so we train their people, staging pilot projects"

The priority for Case C was to provide services for 500 existing clients. The operating challenge in NZ is that they export 98% of their products internationally and do business

in 65 countries. The big question for them is 'how you provide services to 65 countries'? They have expanded their business by locating closer to their customers using local people to communicate to the clients. This is a growing culture of cross collaboration within the organisation. Case C believe that it is important to have commercial international skilled people to lead the teams.

"We had everyone from the team on site sitting within 20 metres of each other, so you don't run into a dead-end street, you can answer all the customers questions…e.g. from the field technicians who install the equipment....if we have an issue that is an unusual issue then they can rely on the engineers who designed it so a lot easier to provide a prognosis to the problem".

In the manufacturing sector employee's skills is largely mechanical engineering, the cultures of engineering and computer science are very different.

"Mechanical engineers think software and electronics is the invention of Satan…a lot of parties bring in 3rd parties….so typically software engineering and mechanical engineering is an unintegrated business that is viewed as chalk and cheese by the sector".

Case C employs people from around the world some have full university qualifications and others are trade certified with field experience and service training. One challenge is to keep updating the service technicians on the technology, the other is dealing with a developing economy. Each country has a different standard to how a field technician should be trained. To eliminate this Case C will fly NZ technicians around the world to train local technicians.

"In India the customers think that the after sales service should be like paying for a local sparky because they are used to buying services under the traditional tradesman model.... but in fact, it's another level of know-how, another level of specialised industrial engineering...a local technician doesn't have a team of industrial engineers behind him or her supporting them".

Case C demonstrates the importance of specialised services to their customers. This requires them to sell the concept of the need for valuable services attached to the product. It is very easy to sell the product at the capital investment stage however discussing budgets and establishing a platform that after sales service is required is hard as most clients do not allow for this in their budgets.

"You can't just tell the customer this is the cost of the equipment, and then later try to sell them the service. You have to factor in the service element from day one".

The challenge is to demonstrate what represents value to your customers. They do this by understanding customer empathy and testing conceptual models with the customer.

"In NZ we are promoting the "better by design process" which is a customer led design process. The challenge is how you bring that into your business, actually developing the customer on site. What you are doing is based on the wants and needs of the customers. The best innovation is led off customer needs and wants".

Whereas competitors in the US or Europe are locally available and are closer to their markets, Case C is a privately led company located in NZ. The challenge is that NZ is geographically remote from most markets and so there is a cost of communicating to customers and to bringing the intelligence back to NZ. However, Case C believes the secret to innovation and collaboration is to be small and nimble as opposed to large and inflexible to customer needs. Their two key competitors are in NZ and one of their subcontractors which they believe represents a "hothouse of innovation and experience". They work closely with Auckland University and believe that it is important for the government to host think tanks so other companies will be drawn to it. Another advantage to being located in NZ is that the wages are generally less than those overseas.

"We are based in the USA, at the moment the US dollar is very high….so if you are going to pay a researcher in the US then it is probably going to cost a lot more than one in

NZ…even the exchange rate itself makes it expensive plus the cost of running someone who needs health insurance…twice what it is in NZ."

The CEO who is also the owner demonstrates clear goals to the company. Employees are clear on what the culture is and how they are supposed to work within it. He has a clear vision of how he wants his company to grow. He surrounds himself with the right skilled people and is customer led in his decision making. Having a service driven vision is vital to growing and innovating the company.

2018 Interview

The company is providing a lot more customisation and specialisation of product/service packages compared to three years ago. In the past 85% of product/service package had been delivered as a mainly as pre-planned standardised packages and this was worked on by Case C before it was delivered to the client. Only 15% had previously been customised packages. They have since developed specific industry knowledge in the construction sector and customised their product solutions based on the usage of the software application. They now include a lot more customer-led design engineering from the outset to suit the customer application.

"For example, when you buy a S-class Mercedes you'll have different options that you can choose in the design process as a customer and that you will pay for the product based on those options".

The solution is different for every customer. Within the package there are a lot of service-related elements such as from customising the software, the mechanical specification and the aftersales services to match the client's needs. These are bundled together to produce a "premium product position" in the marketplace. While they are customising products, they are also trying to standardise aftersales packages so that it is easier for the customer to understand what the packages are and therefore it is easier to market. "While we are

completing more customisation of the package, the after sales process we are trying to standardise for simplicity". They are entering into more aftersales contracts which has accounted for 30% increase in service-related solutions over the past three years. The types of packages can vary depending on the international market.

"If you are in the price-sensitive market the product will be a lot more standardised, their financial budgeting is a short-term thing. We find more developed countries tend to value the after sales experience a lot more".

Especially the companies that are running large volumes and want to maximise productivity. The larger projects want to set up more quickly. In these situations, companies are more willing to invest in aftersales service and support to ensure their plants are running efficiently and to ensure there is access to spare parts. "We have two or three service contracts now we have tried to create some service programmes to actually encourage more long-term thinking". This includes the customers software capability. Working with the customer encourages better by design process which assists in enabling customer-led experiences in designing the package.

As part of the aftersales experience, they have invested in a very experienced group of technicians who are highly mobile and travel the globe from NZ training local technicians to keep the local level of service to a high standard. This aftersales service is how they differentiate from their competitors who rely on large volume, lower priced product volume purchases.

"Localised and competent service is a trade-up with companies that are competing on prices. This is opposite to what we do by selling a premium product, which is also high quality and includes high-quality service".

Case C has also been working closely with tertiary institutions such as universities. They have recently attained software certification through a Chinese university which is paramount for growth in global use of the software. They also have formed a close

relationship with Auckland University in developing university courses with them on the use of the product and community-built research projects.

"We are conducting research and development with Auckland University in a community build project with the collaboration with the public trying to work out which products and services to work with in NZ and then hopefully commercialise that innovation overseas". Since the 2015 interview, the programmes developed are all aimed at growing the service-related revenue and this has been their largest growth in the company. There is an advantage in working with customers creating good service relationships, it manifests into more work later.

"It builds up trust and reliability in that you've got a programme that's well serviced, the customer will come back to your company to work together again. You need to do this to expand your business".

Aftersales service has scored highly and measured by using a Net Promotional Score (NPS) rating with customers. They have recognised they need to work in different time zones with some of their customers who rely on aftersales service. "It is more the date difference, than time difference, that matters particularly if you need to access a work technician to solve any problems". Otherwise all issues are dealt with online and they are developing artificial intelligence to create more self-help for their customers.

"You can solve 20 to 30% of service enquiries through an intelligent directed service and its online 24hrs a day. We have up to date documentation on the process and it gives an instant response otherwise it would be expensive to have staff operating 24/7".

While it is easier to measure revenue from products and services, Case C find it harder to measure profitability per service person because of the increased outgoings such as travelling expenses. Also pricing a customised package is hard with retrospective costing as it is hard to cost every transaction. They rely heavily on customer satisfaction and there

is a reliance on the local service people to provide feedback as to how customers are performing through systems such as the NPS.

"Our local employees are the ones on the frontline. So, if things go well, or bad then they are the ones who tend to be picking up the bouquets or brickbats as the case may be".

The other important customer service-related feedback is on reaction time. If something did go wrong, how quick were they to correct the error. "When it comes to process automation, something that doesn't perform is picked up because the process wasn't performing at full capacity". They see this as a learning process as well for continuous knowledge and improvement in the business.

"We have introduced a total quality programme and everything we do needs to actually meet the business aims; what can we do to improve quality".

They have employed people who come from a high service quality background e.g. they have recently employed a service manager who previously worked for Porsche. "So, you bring that type of attitude to service, to an organisation, then you are shifting the bar to the next level of quality". The company values the depth of skills in their team, "when there are highly technical products the range of skills required to support them is substantial". Where they may have had one person previously dealing with specialised knowledge there is more of a team effort. They have created a knowledge centre of excellence where all topics on each production process and service can be accessed. Everyone, including customers can access knowledge based on their business. The software must be updated constantly to accommodate more variety as each new customer is added to the system. In order to streamline local information, they describe this as being the "master of mass localisation". If there is a customised package, they create a variation on the family of process documentation and systemise that. "We've developed good documentation processes along the way, which turns into a great aftersales experience". This will lead to increased revenues.

The company has had its up and downs “a series of rollercoasters”, where they have grown in some regional markets they haven’t in others, mainly due to political reasons such as one of their markets in the Middle East has been affected by war. So, while their business has changed it hasn’t grown in profits. In 2018, turnover has decreased slightly from $60 million in 2016 to $54.5 million in 2018 (TIN, 2018). It was described as “we keep running just to keep in the same place” in an industry where speed of implementation is paramount.

“If you get it wrong you can burn a lot of cash, and the opportunity costs of either not telling the market, or come late to market, late with the product is vital”

Most of the core product/service comes from within house but there is recognition that in the process information business, there is a need for better partnering and collaboration with other people and companies to provide a seamless product, it’s a key capability. “It’s about finding other people who have got a piece to the puzzle, so that we can make the whole puzzle work for the customer”. There is recognition that this is for the importance for future growth of the company.

Case D

Background

Case D is a family owned business originally founded in the 1940’s. They design and manufacture complex commercial refrigeration solutions globally. They have recently bought a service company so they can provide comprehensive maintenance as part of their overall service. They also provide financial services for buyers of their products. They concentrate on NZ and Australian markets. Revenue was $70 million in 2016 (TIN, 2016). In its early years, they operated from one small factory with 25 staff in the Christchurch suburb of Addington. Today, they occupy the same site but have expanded to more than 300 staff and established a research, design and production plant.

2015 Interview

Historically Case D had been very strong in product selling because that's how the company started and grew because "we kept grinding away until we got it, not because we were geniuses". Case D had earlier tried to enter into other markets such as providing maintenance but struggled due to conflict and barriers within their dealerships who were claiming to have the direct relationship with the customer. The product has a lifecycle of approximately 15 years with at least 2-3 maintenance touchpoints along the way with the average touchpoint being 7.5 years with a major overhaul then it lasts for another 7.5 years. They were not satisfied with the lack of an ongoing revenue stream. There is a huge segment of the market which they weren't operating in which was an anomaly, they are constantly trying to expand into. The company goal is to grow these services.

"If you rent or lease, your touch points are more frequent providing higher margins. For us there are three legs to our chair. Product manufacturing, the service (maintenance and fleet management) and finance".

Case D mention that it is important how you interact your customers and end users by personally representing the branded products and convincing the customer to buy the product. "Once you have their trust then you have to be able to sell these other services".

They admit they are not the best sales organisation. They had survived on equity in a brand and quality of their product.

"It's not to say our people aren't good sale people but we have a naivety to the sales process…I've spent five years trying to find a really good sales manager…I'm on my fourth attempt and I think I've found one".

It was the first time the CEO had got to see strategic sales/account management, as opposed to "here's a muffin, buy something from us". There was a more intelligent approach to selling, it's much more demanding, the marketing people must know their customers better, the level of interaction and knowledge about where the customers are

going and what they need is much higher. By adding services, the additional skill set has allowed Case D to bring in additional income and increased margins that they didn't previously have. By selling services they can get their product in front of the customer as this is where the larger margins are for the company currently. But also, there are risks around selling.

"Life was potentially simpler with just products but now life is better with more options. However, in selling something if you say it wrong and annoy the customers then they will look elsewhere as there are many other options".

Case D runs the services business side of the business as a separate legal entity, but it has identical shareholders, so it is viewed as the one company. We have a primary executive team that looks after the companies i.e. the administration team of human resources, sales and marketing, finance, operations. The financial CFO is also the leader of the finance company and a separate service manager who is the head of services. "Because if you're in manufacturing, services make no sense to you".

Their strategic relationships comprise of dealerships that form part of their newly adopted Priority Partnership Programme (PPP). PPP was brought in to formalise the relationship between Case D and dealerships so that expectations are clear for each party. The idea behind it is to limit the sources that sell the product. Dealerships that form part of this partnership will have the advantage of buying the products at a reduced price compared to other customers giving them a potential strategic advantage over anyone else in the market.

A challenge Case D identified is that when you have an ongoing relationship with your customer you must know when you can charge for services. There is a balance, particularly with customers that are the dominant player in the industry who have huge bargaining power. This needs to be managed carefully, with large orders, that they are not wanting the services for free.

Another issue is that as a business Case D first interaction is with their manufacturing business and not their service business. Sometimes there is confusion as to the services they can provide in-house.

"We will put other service companies forward because we are used to it…and I say, why do you do that, we own a service company….and they had completely forgot. It's not at the front of their mind".

The cross functional operation will come, but it must be a presence of mind, but it isn't there yet, it is something for the company to work on.

2018 Interview

Case D has the same company structure with one executive team with an administration team that supports the team. The difference to 2015 is that they now have a very experienced sales marketing manager which has meant there is a lot more process around the sales and now people within the organisation know there is a service facility. "We now say buy our products, our services and buy it with our finance". There is a recognition that there is more profitability in financing a deal than just selling a product. "We make our money from the finance because the manufacturing business doesn't bring a lot of profitability on its own". The company bundles products and services into packages. "we can take a skinnier margin on each of the different selling groups, but it still provides a healthy return to the company overall".

They have been working hard to grow their middle management team and give them more autonomy. They have all the "right people in the right place" and have a strong team. They are not dependent on one or two people as they had been previously but have a team of people that can support the business from a process and vast knowledge point of view. Revenue has increased "due to diversified growth" to $80 million (TIN, 2018). They have now entered the market that their dealers had fought for them not to be there

“never mind the dealers, we are in there”. The market they identify with is the food service market rather than a food product market and this is assisted by technology. Their service division is still separate, but it is managed by the overarching management team. They still give some of the services away for free “but we are itemising it on the customer’s account so they can see they are getting it for free”. They have looked at their current service model in NZ and it is not scalable to the wider marketplace. To do what they do in NZ and Australia they would have to invest a lot of money and have an army of people which is what they would have done traditionally. They have signed a joint venture agreement in Australia that will mean they won’t need to employ any further people in-house. They will be reliant on external contractors and will be reliant on enterprise resource planning software in order to provide a seamless operation. While they have their traditional model still operating in NZ, they will eventually adopt the Australian business model, the benefits will be scalable with higher margins.

“the reason we’ve done a joint venture over licensing is that it will allow us to work strategically with our partner with all the benefits of working together as opposed to a licensing fee where you just react and pay but not beholden to anyone else”.

Customers are now approaching them because they provide an end of end solution. One particularly customer is impressed with the customer relationship particularly fleet management.

“we say we can do this for you, there is a printout of where all your equipment is and the condition of it”

They provide an asset management plan where scheduled maintenance reminders let the customer know that maintenance is required or whether they should replace equipment.

The company is in a better position to provide an end to end solution, but they also recognise that they need to operate the model perfectly before taking it out to the wider market and not be able to cope with the demand.

“We’ve just got to be careful we don’t get ahead of ourselves because right now were crawling around on all fours and we want to be able to do the marathon”.

They are co-creating with their existing customers, so they make sure they understand exactly what the customer wants. The ultimate success is to increase profitability and revenue.

The business has changed as the CEO (who is the son of the founder) thought he was at the will of his shareholders and his parents but now he feels he is fully accountable and in control of the company’s destiny. He works to a “plan on a page” which allows them to focus on what they are doing and so when someone asks what is happening or something needs to change then he can show what the cost is to change and whether it is worth it or not. “It doesn’t mean it is inflexible, but it’s not arbitrarily changed”.

While services have changed the focus of the company, they still see it as a separate division to the product company. It is supporting the primary driver which is the product. Products and services are reported on separately. They set operational Key Performance Indicators e.g. How many units are failing? What is the percentage of reaction time callouts? There are a lot of customer based KPI’s that set priority times for different types of work responses, e.g. if it is non-dairy then there will be a longer reaction time. They provide feedback on the KPI’s to the customer so that they have visibility. “A lot of our competitors do not have the capability, being about to see the fleet live online”. These capabilities allow for the company to create different touchpoints along the lifecycle of the product with the customer and the potential for further work that may be needed.

One challenge that was recognised back in 2015 was that the sales fluctuated due to a dependence on two large customers due to the way they traditionally conducted business. This is the main reason why they are trying to diversify by pushing into a new market food services rather than food products. There is a belief that with the new joint venture will ultimately mean a lot more business and therefore revenue.

Investment to expand came internally both financially and resourcefully by growing the middle management, upskilling employees and investing by increasing employment of the right skilled people. They did initially buy a services company in 2008 to bring in the maintenance services type work. The goal was to consolidate what they have now and penetrate the new target market by entering into longer term service contracts with corporate beverage and food service providers. They will implement their plan in Australia first and then add NZ in 2019 financial year. The future for the company is to expand in Australia and go global. They are currently trying to form a relationship with a large distribution company in the United Kingdom so they may sell product and services in the longer term.

Case E

Background

Founded in 2001, Case E is a design and manufacturer of large turbines and associated equipment for the hydro-generation industry. Along with their supply chain partners they offer turnkey solutions internationally from "water to wire". They have a proven track record of delivering on Greenfield[4] projects and refurbishing existing schemes. They believe that central to their scope is a quality management system providing cost-effective solutions that deliver on time, world class leading technology and strong maintenance support. They operate in close collaboration with their supply chain partners to design and manufacture state of the art hydro solutions. On the finance side, Case E had raised $1.4m from crowdfunding shareholders and had issued convertible notes to professional investors raising $1.5 million. The company chose to list in Australia largely because the

[4] A Greenfield project is one that lacks constraints imposed by prior work.

ASX was more receptive to companies valued at less than $50m, and much of the company's work was being sourced there. The market for hydro projects was strong with about 124 hydro-electric power stations in Australia and 95 in New Zealand. China, India and other Asian countries are building new hydro schemes, so the market was a growth market.

Case E's product/service offered a full engineering, procurement and construction contract and an ongoing maintenance option that takes the risk and complexity of hydro generation off the hands of the scheme operator. Consulting services include efficiency testing, computational modelling and analysis and business support (feasibility studies, scheme specifications, bid assessment and technical design review). In 2014 the revenue was $7.2 million, and they project to grow to $16 million in 2017 and further to over $30 million in 5 years. They are at early commercialisation stage. The company has more than 50 employees.

2015 Interview

The company has a vision to become a total solutions provider of hydro equipment. To that end, they set about acquiring a local engineering business in May 2015. When they acquired that business, they acquired the business operations and contracts of that company. At the recommendation of their customers they took on the supplier's people and the contracts and brought the two companies together to provide a seamless offering. "Basically, we'd go and design turbines, but we wouldn't build them. Our engineering partner was a precision heavy engineering business that among other things would build some of the designs that we came up with. So, we had a relationship with a client, and we would do some design work and then the client would have the relationship with the engineering company we acquired, among others, to build it".

The vision included becoming more productised because becoming an end to end supplier meant providing a productised solution. The intent is that it will be an additional revenue line.

"In this small hydro industry, we think there is the possibility that we can create a standardised product…it will never become a production line because we can't maintain the volume…but we do believe we can make a standardised product for a specialised market".

Case E feel they are only about halfway to becoming completely fully servitised, but feel they are ahead of schedule with their goal. They raised capital on the basis that they were taking a design company and coupling it with a manufacturing line to have an end to end solution and want to grow it to a $75 million company. The company now provides services, but it currently comes with a narrow definition.

"We go to a client's site and service their equipment. The beauty of that is that is establishes good regular revenue. It is returning a more consistent revenue (instead of a one-off purchase) but is also helping to build relationships with a client so you are in a better position to win any project work".

Taking on full cost of ownership is another business model that doesn't fit with their current strategic business plan. However, they are considering it. The company discuss how to possibly approach this as a business.

"Infrastructure as a service…we think that particularly for the small distributed hydro there is potential". Basically, we own the kit, we implement it and we have a design that's suitable e.g. an irrigation canal. We could say – 'don't buy it off us, we'll install it, we'll sell you the power out of it cheaper than you can currently buy it', and we'll make a profit at the same time. However, that asset infrastructure ownership model has a totally different balance sheet requirement that's not us today".

Case E recognises that it would need the right investor, a group of people to recognise this proposition as a profitable business model.

The finalisation of the acquisition and merging of the two companies took well over a year from when that was first mooted to when they finalized the deal in May 2015. All the employees from the manufacturing company knew what was happening.

"To be fair, they saw our company as having vision and growth and I think it became very appealing to them to be a part of that again".

Even though the negotiations took a long time, there was this anticipation that the acquisition was going to happen. At the same time, the firm co-located to the building the engineering company. We detailed what the supervision of staff was going to look like six months before the acquisition was finalised.

"While it was unfortunate that the acquisition took longer than planned, it had the great advantage that when it took place, we very much hit the ground running because a lot of those culture changes had already begun and were well down the track".

The choice to co-locate was deliberate, the longer amount of time to finalise the acquisition wasn't planned but it had one positive side effect and that on day one they immediately put in place a 100-day plan with clear goals to achieve in the first three months.

"Communication was vital…we had fortnightly meetings with the entire team talking about what was happening, what was going to happen, what the vision was".

Leadership was very important, in conveying a direction that was clear about the future vision of the company and the employees and sharing that vision, setting expectations. This is still ongoing and there are still some cultural changes to occur. It is important for the engineering employees to feel like they are part of the staff.

"Some employees have been 30 years with the company…. then suddenly, they feel like the new guy…. they are used to the way they have always been operating".

There was positive level of engagement and higher levels of motivation as management made a presence in the workshop, talking to people and showing an interest in what was happening there. The challenge was empowering the supervisors to feel they could make decisions and to open their minds to the new way of doing things, the supervisors been there for many years and being used to being led by the top down i.e. "being told exactly what to do". Management recognise they need to bring more skills across the company as well as additional skills into building a sales and marketing team. They won an award for a clean technology hydro installation design a consequence of this is that they are attracting design engineers and machinists for work.

There have been massive changes but that has been a deliberate move as part of the company's growth vision. Sixteen months ago, the design company had been turning over $1.5 million for the year. The year to March 2015, revenue was $2.3 million. The acquisition of the engineering company has meant that the current financial year will turn over revenue of $12 million (2015), with a forecast of $16 million in 2017 with confirmed orders. They do operate mainly in New Zealand, Australia and the Pacific and plan to expand to Asia and the Americas. The difference between Case E and their competitors (who can make a turbine to an existing design) is that most of them cannot design a turbine and manufacture it. Case E is the only company in New Zealand, Australia and the Pacific that can both design and build a turbine for smaller projects.

"Billion-dollar companies operate at a certain scale. To them, the small projects aren't worth getting out of bed for. We are right here; we are local and close to the customer".

It is very important to clients that Case E is in NZ and Australia. In NZ, sixty percent of energy is generated by hydroelectricity. There is potential to provide the same in Australia as they have as much capacity for hydroelectricity as NZ and we have a strong reputation of know-how in this industry where they are known "as the being the centre of excellence".

2018 Interview

When I came to interview Case E in late 2018, they had been put into liquidation by their main shareholder and funder in mid-2017 and had estimated that there had been a loss of $12.6 million loss to creditors. At that time, 200 creditors were unlikely to receive anything back because, as reported by The Press in last 2017, Case E had never owned any significant assets. My investigation into what happened found that Case E had not purchased any significant assets at the time they bought the manufacturing business's ongoing contracts and operations in 2015. The assets remained with the original manufacturing company, which was still operating, and Case E leased the premises they were operating from.

The formation of Case E had promise of success at the time of acquisition. They had clinched an $8.5 million contract to refurbish a flood-damaged hydroelectric plant at Somerset dam in Queensland. The company has also secured a $5 million contract with a Melbourne generating company and had set up an office there. These forward orders were thought to give Case E the financial strength to offer returns to investors and invest in growth in the future. The CEO who I interviewed in 2015 was an interim CEO at the time and Case E board were about to appoint a permanent CEO to the company.

I did manage to speak to a senior manager of Case E in late 2018. He confirmed that Case E had bought the goodwill and existing business that the engineering manufacturing company was operating over and above the hydro work.

"I mean it was the intellectual property I guess that came across that Case E had picked up. The manufacturing company kept the ownership of the equipment and they didn't own the property at the time, some other entity did". They had an interest in the machinery plant which there was set timeframe to purchase at an agreed purchase value in the future".

He discussed that there had been a desire for Case E to standardise the type of product they were manufacturing to get some economies of scale. "At the time Case E had been a design house and it made sense to bring the design house and manufacturing together". The company had started well in that there was a very good supportive CEO and it seemed there was potential for both teams (engineering and design) to work together. "Initially the culture was very good, but I think it was always going to be a "us and them" mentality between the two groups – design and engineering".

While there was potential, he felt the board were not "up with the pace required" as far as the manufacturing was concerned. The business didn't have the capital to implement what they wanted to achieve, and this impeded the growth. Also, the new design engineers while they were very good, they had had a track record of previously combining with a manufacturing company in the North Island and it had failed on the basis that while they were good at design, they were slow at delivering that design.

"They weren't able to satisfy the customers' needs and their personalities were quite strong, and the new CEO didn't want to hear that the manufacturing couldn't actually produce the design, so there were all sorts of technicalities that went towards failure, including that there weren't the right people at the top".

I relayed what the CEO at the time had projected for the company's potential earnings in the first 3, 5 or so years i.e. from $7.2 million in 2014 to $16 million in 2017 to $30 million and over projected for 2020. He exclaimed that "that was the board talking". The board had been clear that it was expecting significant returns very early on, without putting in any further capital.

"The board and shareholders were trying to maximise their investment and get their money back and list the business in Australia. They spent a tremendous amount of effort and time and money trying to list and they wanted their money, a quick turnaround".

The company went into liquidation mid-2017. The design engineers had already set themselves up as another company "it just goes to show there is a demand for design, the need is still there". In his opinion, they had the wrong people at the top including a "strong leader" and he feels they "wasted not only public money but investors' money as well.

As of February 2019, the shareholders that had forced liquidation had been required to repay money to former Case E after liquidators were successful in clawing back some of the money collected by the shareholders just prior to the appointment of the liquidator in 2017. The liquidators had concluded that Case E had lacked "sufficient working capital, had staffing constraints and had little in the way of its own intellectual property despite winning major hydroelectric projects" (NBR, 2019).

Case F

Background

Case F was founded in 1964 and is a specialist manufacturer of high technology products and services including designing, manufacturing and marketing products and solutions designed to increase the efficiency and profitability of the agricultural sector. Their key products include milk cooling and storage, dairy automation, weigh scales and EID, electric fence, milk meters and security fencing. There are currently 548 employees and a revenue of $147 million as at 2016 (TIN, 2016).

2015 Interview

Case F entered the services market when they acquired a technology services business that owned a product set that that they wanted as part of their product offering. The acquired business had a services division which provided services that included supply and installation of the product as well as maintenance services including a helpdesk available 24/7. Offering services to customers was the consequence of acquiring the new

product set. They vertically integrated their business to provide services for, not only their own customers but competitors as well. Initially the services division was making a loss, but Case F saw the opportunities that services provided e.g. good profit margins, and their focus became more orientated towards the services market.

"There are other things that you end up doing which you don't charge for but then you can bundle up and bury in the bundle and charge for it"

For approximately 10 years, Case F had been selling a product and not providing the facility of collecting data and utilising the information. In the last 5 years it became apparent that they the customers needed support by offering them advice, showing them how to utilise the information and sharing it with them. They have found the transition from selling a product to solution-based offerings hard. It has been slow journey due in part to the company having to take the initiative in instigating the change sometimes at the reluctance of the customer "we have been driving it, farmers tend to loathe change". Initially they kept the company structure the same and operated the service business separately. "We ran it separately, as a standalone entity for the very reason that services are different to products and we plan to keep it separate".

As a result of acquiring the services company, they found they needed people with more marketing and customer relationship skills as well as technical skill, "it was more of a helpdesk-type service, but you also have some product knowledge as well as someone just answering on the end of a phone". The engineering graduates make up the product team and marketing people sell the products and services. However, it is the solution selling which they are still learning about. "It's more about trying to coach the salespeople how to sell a solution and we would love to do it better". Case F's initial strategy was to create a service division to provide a help desk.

"We knew there would be some paid revenue and that we could propose a model and that initially it was going to be a loss-making entity…. however, over time we enhanced the service division where it now roughly washes its face"

Now the service division consists of providing a help desk for farmers who need assistance with the technology and they also provide consultancy and analysis in conjunction with complex data programming.

"In the past the product was something you bought off the shelf but over time then we observed a more complex product which had to integrate with other products so you had to be able to Bluetooth with your phone…or need to be able to put it on a USB or store in the cloud….so that required us to create a service group off to one side that enabled us to utilise the full capability of the device".

Case F are 2 to 3 years into the transition of providing solution-based offerings (taking total cost of ownership). They are initially prototyping this service in New Zealand only but have plans to expand on a global basis. NZ is very much the testing ground for the services.

"You might start walking down the path, then you get to the point there is a different way you can go to market…. you can bundle into a package, so therefore a product price is not visible to the customer…. they only see us providing the total cost of ownership".

There have been some challenges, the customers initially were resistant to change particularly when customers were being asked to pay for services. Case F found the challenge was to create a pricing package and demonstrate the value-add of ongoing services and that the value was worth more the sum of the product.

"They are doing something that they are not used to doing that way previously……its foreign to them and it's about trying to get them to understand that total cost of ownership is the way to go and better than just the product off the shelf with no support"

The existing relationships with their customers allowed for Case F to get collaborate with the customer on board. They did this through showing the customer how it was going to work.

"Sometimes the only way the customer can understand is by just doing it and then decide to invest." This is was on the promise that Case F would be able to deliver, a necessary way they concluded to achieving the desired outcome of providing solution-based offerings.

2018 Interview

For the year ending March 2017 the company reported a net loss of $3.5 million with a revenue of $125.6 million, compared to a loss in 2016 of $14.3 million with revenue of $141.2 million (NBR, 2017). 2018 has seen an increase from 2017 of $14 million in total revenue to $139 million. A downturn in the world's dairy market, in particularly the Brazilian economy where Case F is based, had been challenging. In the last 15 months the product side of the business has been sold to a larger Swiss competitor who has bought the product and dairy side of the business without the service part of the business. There is a question mark over whether the service part of the business will sell to another manufacturer in the future.

"It's small and it will logically fit with a larger entity who might value that part of the business. Something like this happens where a strategy was set in place, but then a deal comes along which causes a strategy to deviate one way or another"

The CEO had been working on the deal over the last two years and thought that the larger competitor might be interested in the whole business. They were only interested in part of it "the deal was good enough that we wanted to let them run with part of it". Consequently, all the effort and focus in the organisation went on executing the deal with

the focus taken off the services part of the business “because we didn’t have the time or the bandwidth”.

The company is now a smaller technology business with a help desk business. The data that is captured is through the RFID tags and sensor devices that are in dairy sheds and some animal weighing systems. The current board is now wanting to sell this part of the business.

“The boards view is that as it sits now, it’s not sustainable on its own, it really needs to be part of a bigger business”.

The ex-CEO still sees that there is opportunity was in the marketplace, and that they knew at the time (back in 2015) that they needed to find a way of monetising the data that came out of the technology company and the help desk business was the primary vehicle in achieving that. The challenge was the organisational design. “I think one of the trickiest parts is when you’re a product business there are people that you need to assist you in the software side that aren’t currently in the business”. They had to employ software engineers. Most of the work was embedded software and they needed software that created a user interface and then selling this into the marketplace is a different set of skills, which was a big change from what the company was used to doing.

Linking the salespeople to the product people had its challenges. “We spent a lot of time on this and probably went through three or four organisational design iteration”. The problem with trial and error is that there is limited capital to invest in this type of trial and error work. It is expensive work and too many wrong steps is costly. “If you look at Silicon Valley, they have a group of venture capitalists that can assist them with money”. However, it was more finding the good people which the company found challenging and encouraging the cross collaboration

“In the US there would be a lot more people who were doing similar things that you could go and talk, that may not be competitors and don’t mind sharing that information with you”.

In NZ, there are not a lot of people to collaborate with. There were plenty of customers demanding wanting to prototype it but “didn’t want to pay for the experience”. Farmers are already using their technology.

“A sixth-generation farmer, the son has become a real data-centric farmer, his father and uncle roll their eyes at him and look at him and think “oh god what is that silly boy doing? But, he’s really into looking at breeding trends”.

The new technology the common denominator is understanding the performance of every animal individually. “Historically a farmer would have 3000 sheep and treat them all the same, now there analysed separately”. The ex-CEO does believe that the data centric model of farming is the way of the future. Now that the product business has been sold, he feels that the smaller business will now be able to focus on new technology innovation. He does think that the company that bought the product business will need to look at service offering in the future, but they aren’t looking at it yet. “Some of the products the Swiss company have bought are still integrating with the help desk of the service company we own”.

When they were measuring outcomes, they were measuring revenue by the salesperson as it was still being run as a separate business entity. When a salesperson sold a service, they would also introduce the company’s product line, the company hadn’t recognised the product sale had come from that type of sales introduction. “We hadn’t got to the point where we had been attributing product sales to the services team but there was general recognition that they were starting to have an impact on the product business”. They didn’t spend enough time on prospecting and spent too much time on the help desk issues. These were some of the insights that came out of understanding how they could

create more sales. There was a cultural change in that we had the “people out on the farms talking to farmers, bringing in the business that way”. It required a different temperament “we did go through a couple of representatives; it was because we were selling a new service and that required a lot of persistence”.

Appendix 4: Case Dynamics Matrix – Within Case Analysis

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
Case A							
• Falling Revenues • Cannot compete on standalone products • Technology sector is rapidly changing, uncertainty of environment • Business sustainability in the long term – lumpy revenue from large one-off projects. • Lose NZ market share. • Giving away of services for free to sell products	• Cannot be market leaders globally, can't compete with standardised, cheaper product coming from Asia • Competitors identifying a gap in NZ marketplace to become service providers and this will allow them to sell their own products. • Internet of things, new software capability Customers demand for added values services with product and expecting services for free (or at minimal cost). • Customers trusting product sellers to provide services they once delivered internally. Customers not ready for "radio as a service". Also,	• Search for market opportunities. Added value services to their product. Chose to narrow down offerings to selected market sector (public safety and utilities) • Knew how to design IP networks around product so look to building new capabilities around service-related innovations (SCADA) • Had multilevel relationships with current customers. Known as	• Restructure and reorganise internal operational and organisational boundaries, structure and procedures. Build service capability within the company by retraining. • New Services division which works as separate group within organisation with own performance targets. • Training engineers to understand service-related capabilities, working loser to the customer.	• Profitability decreasing (lean years 2012-2015) Cannot go out of business (product run rate business suffering). 2016 Total revenue $175 million (TIN, 2016), 2018 $171 million (TIN, 2018). • Disgruntled stakeholders/shareholders • Unable to provide everything to customers internally, i.e. hardware, services around SCADA monitoring and consultancy, internet of things. • Ongoing financing of new solutions platform in jeopardy. • Engineers typically don't have comprehension of services, more interested in product features and performance. • In 2016 Product/Service ratio was 66.6/33.3.	• Taking product (run rate business) for granted. All profits reinvested into service provision. High expectation of how to build services with limited capital. • Underestimated transition challenges such as implementation was taking longer than expected (10years). Questioned if transition should be more incremental rather than build outright. • Initially metrics for measuring performance were hard to extrapolate services from products (initially weren't charging for services). • Was measuring customer satisfaction but had to retrench to concentrate on financial targets • Had government contracts but not private sector contracts	• Retrench and Refocus in 2017 and 2018. Be agile, change if necessary. Product run rate business profits must be reinvested back into products. • Search for new supply chain partners to expand market reach both domestically and globally and act as a defence strategy against competitors setting up in NZ. • Look for aligned business investor to inject capital	• New supply chain partnership will mean expansion into domestic and global market. New, lengthy managed services contracts. • Tailor (with partner) added value services and charge customers accordingly. • New investment partner has taken 40% minor ownership stake. Trust holders now receive dividends from services • Sold headquarters

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
• Gaining customers trust • Taking on risk and full accountability for service delivery • Low barriers to market from competitors	perception that outsourced services would be cheaper than operating themselves, not looking at the added value concept of service solutions	trusted suppliers in the Public Safety and utilities industry. Look to work more collaboratively with customers and supply chain partners	• Learn to work in collaboration with other divisions within the company. New project teams set up of 5 people from different divisions to discuss what a service provision will look like. • Work with large existing customer by managing their network. Held brainstorming sessions with customer to conceptualise service proposition and then developed design plan by prototyping. Customer will then be comfortable to pay for	Would like it to be 70/30 ratio. • How to finance ongoing service innovation growth. • Lose domestic market share • Increase global market share	• Still threat of competitors setting up in NZ	for research and development. Sell minor stake, change ownership structure from 100% trust ownership to allow this • Sales incentives so that teams work together, need to report on shared targets. • Separate product and services targets, financial targets. • Sell headquarters building and put in place leaseback arrangement. Capital invested back into business. • Collect customer	for tens of millions. • Research and Development team working on SCADA (and Industrial Internet of things) have won North American deals. • Product and service financial targets measured separately: no. of orders, profit margins, market share targets currently at 2018 - 77/23 product/service ratio (due to retrenching and refocusing). Would like this to be 70/30. Currently meeting

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
			managed services.			satisfaction data in future • Increase Research and Development	targets on a quarterly, annual basis. • Barriers to external competition.
Case B							
• Cannot compete on price in wider medical device market. Competition from Middle East and Asia. • Customer demand required end to end solution, not being met in wider market. • One large contracting client is a risk due to one day ending contract	• Stretching the company across many product types – straining resource allocation • Competitors aren't meeting delivery timelines of customers, need flexibility • Customers want one company handling all aspects of supply chain • Grow client list and a need to find a way to generate more work from existing clients • How do they expand to greater medical device marketplace – has potential • If a job goes wrong, then large	• Needed investment to expand specialist offerings • Narrowed down product offering to specialised medical devices (orthopaedic). • Vertical integration to provide end to end solution – keep everything inhouse e.g. regulatory applications • Build closer relationships with customers,	• US backed company to pay off existing debt in holding company and provide funds for R&D and open future sales avenues. • Create three product/service lines – contracting, bespoke and signature • Aim to reduce reliance on contracting manufacturing • Increase bespoke and signature range. • Longer contracts, closer	• Directors have different visions • US backed investor wants to concentrate on Robotics not just medical devices • Raw materials are scarce. US manufacturers are manufacturing at home and need more materials than they extract themselves pushing prices up. • Need to expand signature range, higher margins (currently 3% of business) • Customers want more information • Some customers wanting them to unbundle solution and provide just product • Keep R&D in NZ isolated from competitors	• Where to find new investment needed • Decrease resource dedicated to Bespoke to put into signature range produce higher margins – more profitable. • More reliance on being differentiated so can charge higher prices to cover raw material cost. • Better data needed to inform customers to help patients avoid unsuccessful surgery. • Can't provide everything to everyone must keep end to end solution selling • Competitors potentially moving into solution market.	• Approach local NZ investors • Keep R&D in NZ • New strategic direction (building company, building profitability, expanding product development) • NZ dollar good for exports so earning more dollars. • Expanding overseas exposure. Actively selling to wider orthopaedic medical	• 100% NZ investor • Setting up in Australia, similar model to NZ. • Attending trade shows in the US. • Increased R&D. building company, moved into new building, more room for expansion • This month taking delivery of $1 million in manufacturing equipment. • Employing 5 more manufacturing employees

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
• Only one revenue stream from contacting manufacture • More value from consulting services wrapped in product • Culturally, engineers don't do marketing as part of the role description	customers will turn to competition. • Too heavy reliance on contract manufacturing, need to grow bespoke and signature production. • Currently giving away services to sell product • Employ marketing manager to assist in selling and training of existing staff.	becoming part of R&D team. • Prevent customers going to competitors – differentiate by growing Bespoke and Signature ranges. Design time currently allocated 12% contracting, 5% signature and 83% bespoke. • Increase marketing, more reliance on selling.	relationships with customers – trusted supplier (cross collaboration). • Marketing no longer "fluffy" language, importance is recognised.0			device market (signature range). • Internet marketing • Build communication systems to assist in building networks to ensure team can work together seamlessly. • Look at "data that informs" technology. Informing customers to assist in rehabilitation not just surgical equipment – monetarising data. • Investigate licensing technologies for signature range. • Keep building business,	this year (2019) • Keep contract manufacturing to a minimum • Signature range now 24% of business (was 3%) – want to execute this work a lot faster in the future (margins at around 50%) • Overall profitability is up 38% from last year (2017). Profitability up from $5 million annual now projected for $20-30 million in the future.

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
						employ more people. • Don't take on just product business, turn away customers.	
Case C							
• Asian mass production means cannot compete on price alone. • Eager to bring in IP to business to add value (technology driven) • Customers only want to deal with one company. Provide end to end solution • Falling Revenues	• Losing market share to Asian product manufacturers • Major supply chain partner is retiring. Clients concerned about lack of end to end service. • Clients express need for design component • Realisation that software IP is the future of the business	• Vertical integration to provide end to end solution • Acquired business of retiring SCP who had design capability • Acquired business to software design capability to bring IP into the business • Had established locations globally allowed them to work closely with customers	• Work with tertiary institutions such as universities and government "better by design" research think tanks which focus on design led by the customer. • More prototyping with existing customers • Create a standardised package and a customised package which is more of a collaboration	• Revenue dropped between 2016 to 2018 by $5 million. • Net Promotor scores reveal that after-hours service needs to be available during the day (on NZ weekend) in a different time zone. • Business is privately owned and relies on investment from main business owner. •	• Customers in different global time zones and after hours needs to be available and able to respond to customer demands • Find ways to increase profits. Need to increase customised work as they have higher margins.	• Grow company. • Enable shift work through the weekend to respond to global customer demands. • More partnering and collaboration needs to occur with supply chain partners to provide total package. Work together to provide solutions. • More online input (future is in software). • Create high quality brand	• Create higher margin work through customised solutions. Push customised output to 30% of the business. • Employing top service managers from company's like Porsche • Created "centre of excellence" Taking advantage of technology creating "MyFramecad" (Internet of Things).

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
		• Upskill employees to consult and advise clients • Move to larger premises in NZ to house management team and manufacturing division. • Everyone seated in similar area to allow cross collaboration to occur easily. • Fly NZ technicians around the world to train local technicians in each country to keep servicing standards to a high quality.	of effort between the customer and supplier. • Enhance online software platform • Employ more software skilled people who are knowledgeable in computer science field.			• Become Master of Mass localisation • Create good documentation processes and systemise this. • Improve speed of implementation of product and services	• Improving aftersales experiences

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
Case D							
• Asian mass production means cannot compete on price alone. • Dominant downstream supply chain partners mainly in beverage market • Lumpy one-off revenues (need more touchpoints throughout lifecycle of product with customer) • Grow client list	• Unable to compete with Asian manufacturers on product alone due to mass production. Losing market share in product market • Unable to compete with customers directly because of middle SCP (dealerships). • Giving away services for free • Confusion around definition of what services are • Recognise service market opportunity, particularly around fleet management • How to charge for services • Coordination issues with current team not working together particularly in selling services.	• Vertically integrate by splitting company into 3 divisions, product manufacture, maintenance and fleet management; finance (lease or sell) • Use existing premises and expand in current location • Training and upskilling of current staff needed. Bring in expertise. • Working with customers	• Acquired service company (maintenance) brought in servicing capability and increase touchpoints with customers. • Provide financial assistance to product as part of implementation package • Upskilled staff, more marketing, selling expertise. Financing expertise. • Formalise contracts with dealerships (Priority partnership programme) • Expand to corporate food space.	• Need to expand offerings to current customers • Need to adapt to new business model of selling in packages (i.e. not just product but services as well). • Not a strong selling organisation (not originally) • Previous family ownership heavily product focussed	• Barriers to customer with dealers in the way • Marketing and selling must be combined, representatives from 3 division to market to customer • Current business model in NZ not scalable (everything provided inhouse).	• Cut dealers out of relationship, deal directly with customers. • Trial new business plan in Australia with joint venture partner to provide end to end solution • Bring business model back to NZ once successful • Co-create with existing customers • Negotiating distribution deals in the UK • Clear strategy “plan on a page”	• Increase profitability and revenue (2018 $80mill up from $70mill in 2016) • More varied clients, not reliant one or two large clients • Negotiating longer term contracts with customers • Roll out Australian business model to NZ. • Looking to go global (UK)

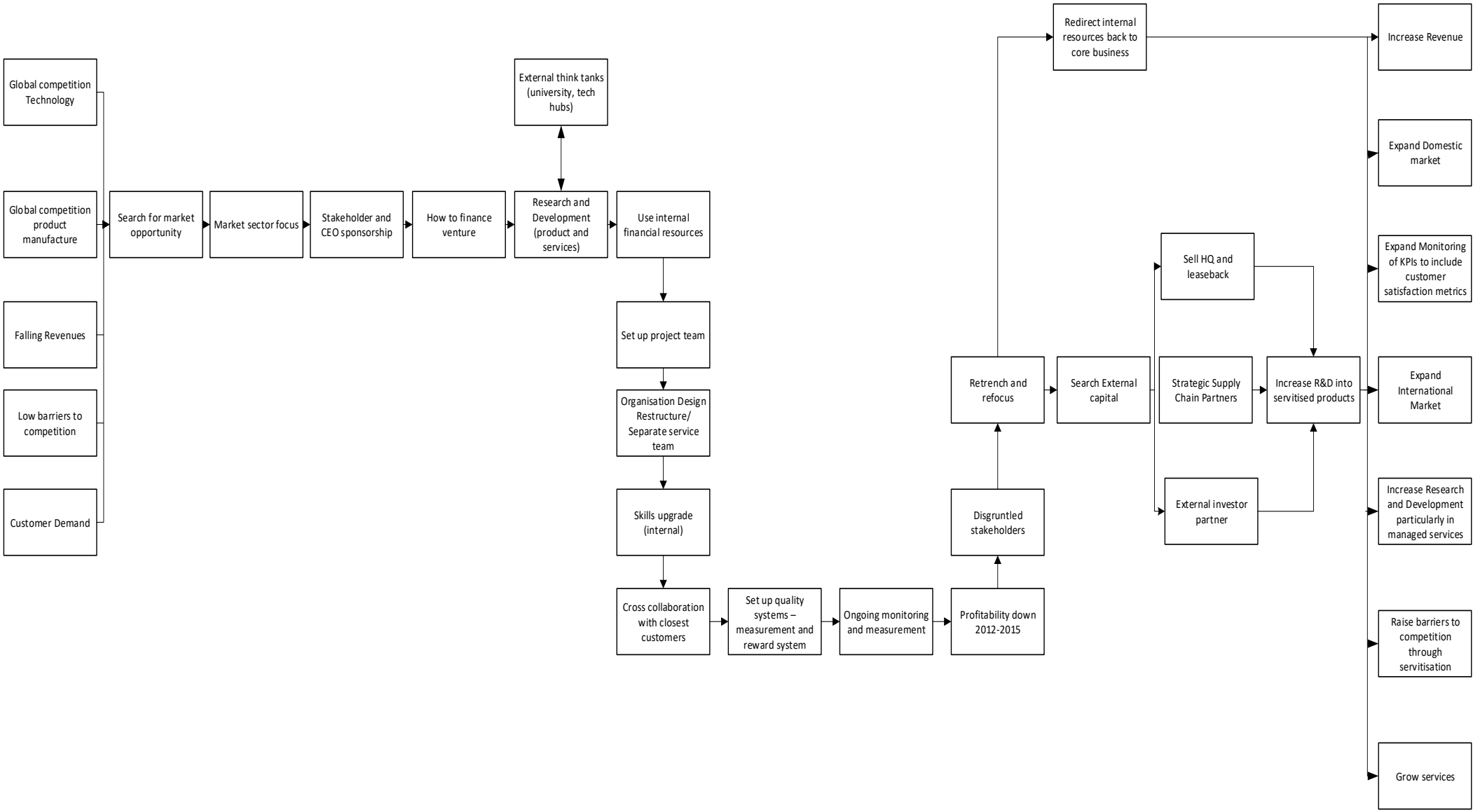
2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
Case E							
• Customers demanded seamless offering • Supply chain partner was not performing • Ongoing and additional revenue instead of one-off project revenues. • Potential growth for smaller specialised suppliers of hydro equipment particularly in NZ, Australia and Asia.	• SCP was underperforming and wasn't delivering on time. Saw an opportunity to come together and provide seamless solution for customers. • Potential growth market in Australia, has the ability like NZ to use hydroelectricity as a source of energy. Green energy becoming very popular globally • One-off projects meant that revenue was indiscriminate and needed to have more sustainable reoccurring revenue for company. • Large competitors competing on large orders and price, Case E can't compete. • No company was providing turnkey	• Opportunity to acquire SCP business contracts and operations • Raise capital through venture capital and list on ASX. • Creating a standardised product for the specialist market for small to medium customers • Considering taking on "total cost of ownership" • Co-locate in manufacturing business building - 100-day plan created for first three months. • Appoint permanent CEO (interim in place)	• Acquired Manufacturing company in 2015 • Investors are local and listed on ASX • Awarded two new big contracts in Australia for combined $13.5 million. • Raised 1.4m crowdfunding shareholders. • $1.5m from professional investors • Appointed permanent CEO	• Acquisition took longer than planned. • Not meeting customers contract requirements • $12.6 million loss in 2017 therefore not meeting expected returns (making a loss) • Investors want short-term return • Underestimated amount of time to transition to new type of business • Overestimated what they were going to make in near future (made a loss in fact) • No "new capital" to assist in the transition phase of the company. • Change in CEO. • Due to pay for equipment by specified date • Lack of cohesion in team and supply chain Liquidation	• Contracts were new clients, no existing relationship (not working on a collaborative basis) Expectation is will deliver on time etc • Not enough capital invested • Staffing constraints – teams not collaborating (still operating as two divisions – manufacture/maintenance and design) • Little in the way of intellectual property (no asset value) • Lack of consistent ongoing leadership • We're not in a position to buy equipment as had been recording losses. • Operated divisions in silos and did not engage SCP including customers	• Company liquidated • Liquidators try to claw back funds from VC	• New design company offshoot • Liquidators successful in receiving some funds to repay creditors.

2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
	solution for smaller projects "water to wire" (taking risk off scheme operator) • Feel like they are "halfway through" the transition process.	• Forecast $16 million in 2017.					
Case F							
• Domestic competition is strong • Grow business for business growth • Customers are needing more information with product, product knowledge that assists in data analysis and consulting on best use of product.	• Other large competitors in marketplace who have larger market share. Recognised a need for product specialisation. • Reliant on too few customers, need to expand company to grow. Look overseas opportunities	• Search for opportunities – acquire new product lines • Need more capital investment from owners, selling share of company? • Vertically integrating by adding value added services product will increase overall company value (for potential sale in the future?)	• Acquired product company that has services division to business (technology services and helpdesk) • New service customers were some of their competitor's product. • Ultimately in the long-term provide "total cost of ownership". • Looking for potential buyers for business.	• Downturn in world dairy economy particularly Brazilian market where Case F is based. • How to run a service business- need new capabilities customer focus. • Integrate product with data to enable full capability of the device. • Need to learn how to solution sell not product sell. • Profitability down years 2016 to 2018 • Not measuring solution selling, only product sales. • Customers don't like change	• Realised and saw and opportunity of selling services alongside product. • Need to upskill current team in how to sell solutions. • Gain trust of current customers (farmers) to collaborate and pay for services. • Need to be able to sell services • Not recognising sales of product from solution selling. Just looking at revenue per salesperson • Had specialised product line that competitor wanted	• Keep services and product business separate but bundle services in with product. • Hire more software engineers and marketing and salespeople. • Large swiss company only wanted to buy product business	• Sold product business to large swiss company 2018 • Swiss company do not want to add services to their product offering. • Still has service business but unsure if company is going to keep the $32mill a year business.

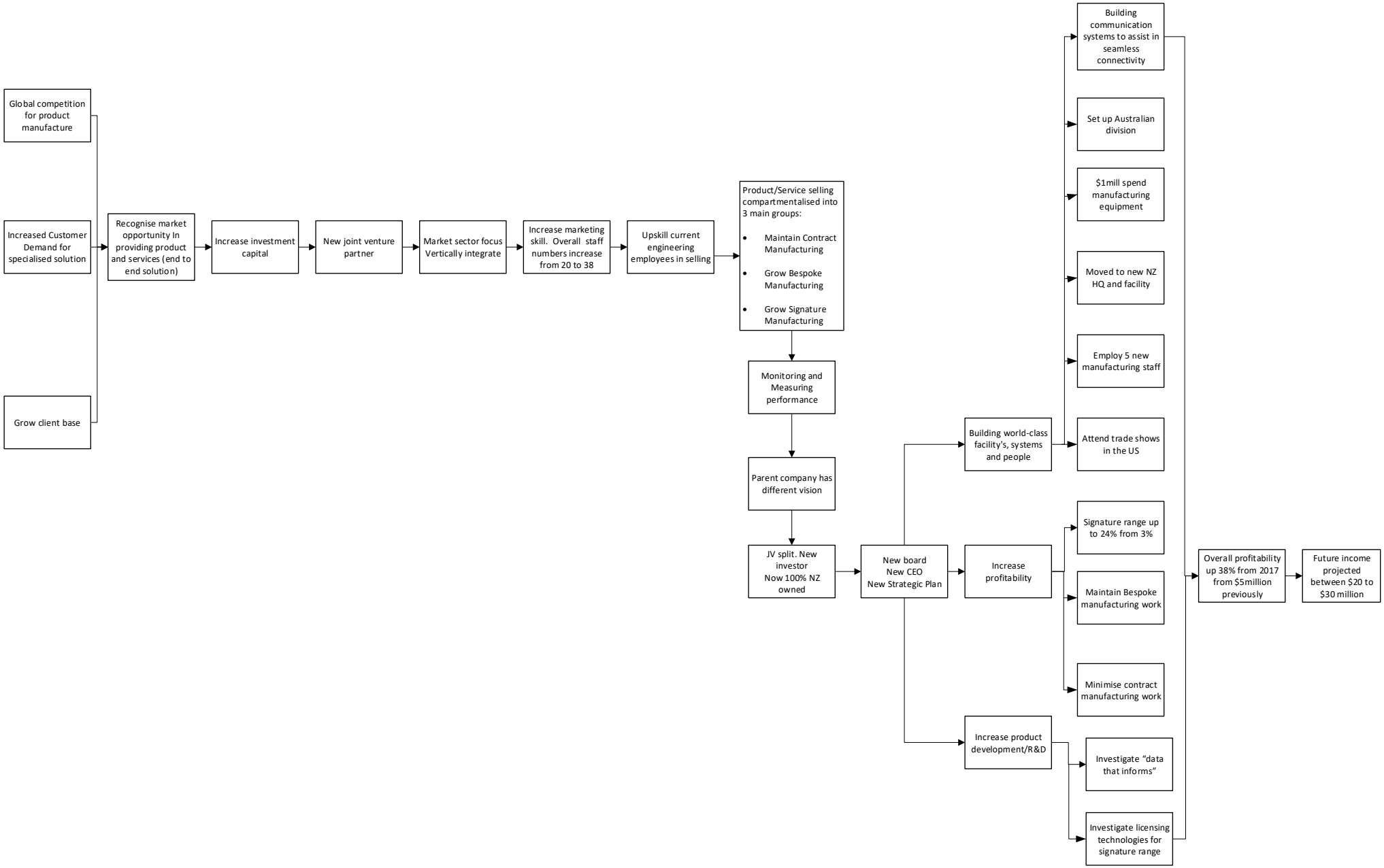
2015				2018			
Dilemma (the problem)	**Issue (why there were perceived as problem/opportunity)**	**Action Plan (how did they cope with the issues**	**Resolved (resolution of the action)**	**Dilemma**	**Issue**	**Action Plan**	**Resolved**
				• Approached by large swiss competitor to buy Case F who only wants product business – Case F wanted to sell whole company.			

Appendix 5: Within Case Logic Models

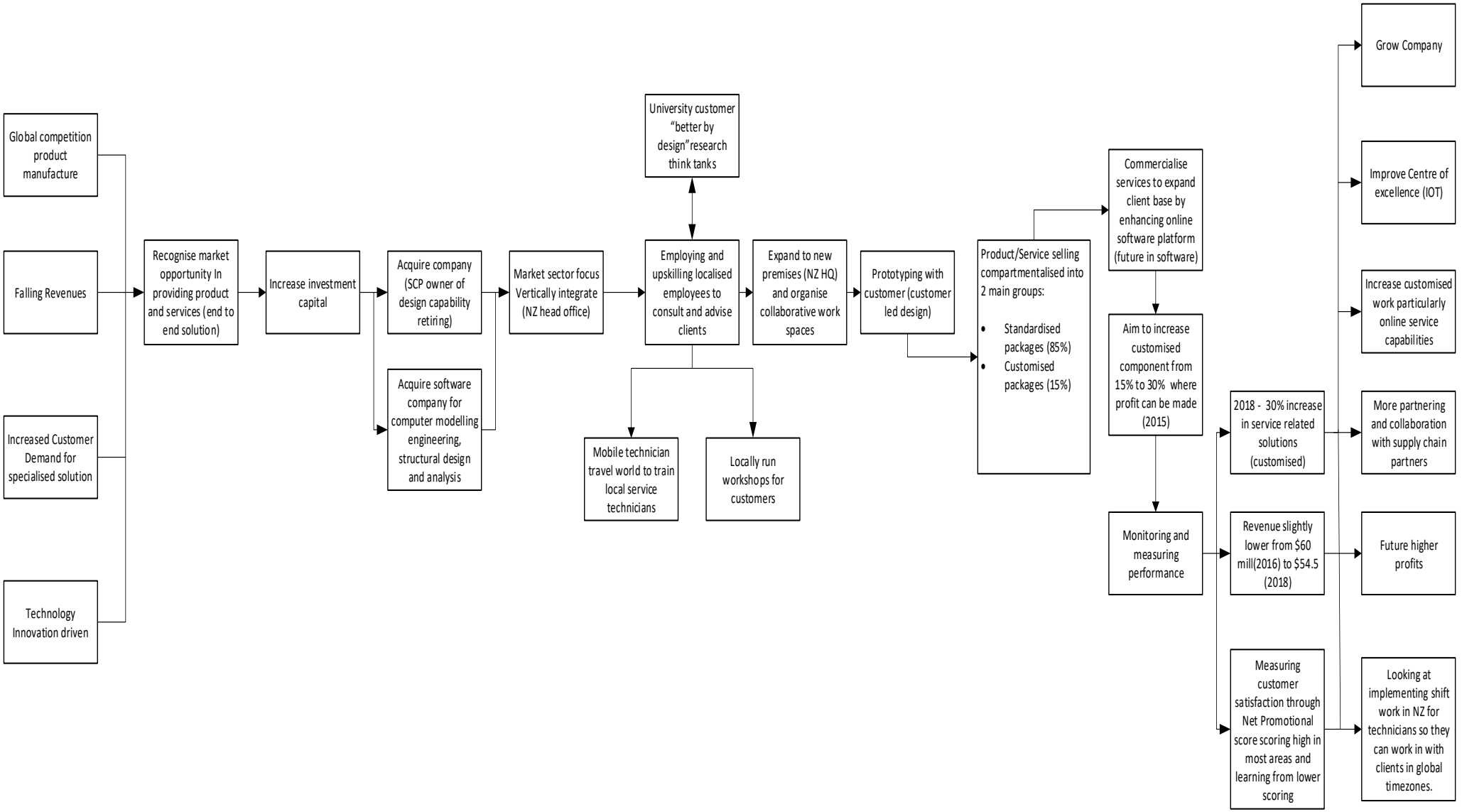
Case A



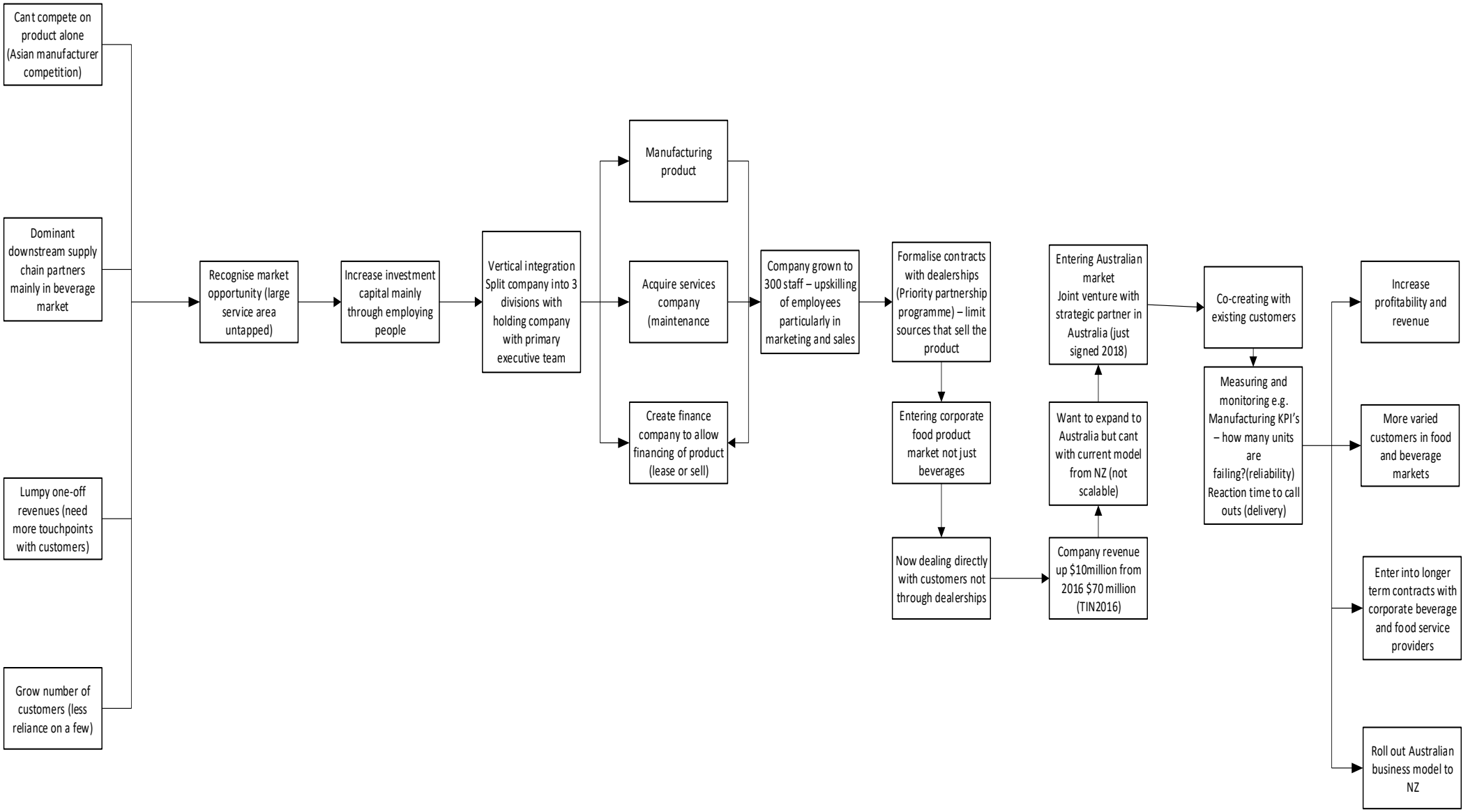
Case B


Global competition for product manufacture
Increased Customer Demand for specialised solution
Grow client base
Recognise market opportunity In providing product and services (end to end solution)
Increase investment capital
New joint venture partner
Market sector focus Vertically integrate
Increase marketing skill. Overall staff numbers increase from 20 to 38
Upskill current engineering employees in selling
Product/Service selling compartmentalised into 3 main groups:
Maintain Contract Manufacturing
Grow Bespoke Manufacturing
Grow Signature Manufacturing
Monitoring and Measuring performance
Parent company has different vision
JV split. New investor Now 100% NZ owned
New board New CEO New Strategic Plan
Building world-class facility's, systems and people
Increase profitability
Increase product development/R&D
Building communication systems to assist in seamless connectivity
Set up Australian division
$1mill spend manufacturing equipment
Moved to new NZ HQ and facility
Employ 5 new manufacturing staff
Attend trade shows in the US
Signature range up to 24% from 3%
Maintain Bespoke manufacturing work
Minimise contract manufacturing work
Investigate "data that informs"
Investigate licensing technologies for signature range
Overall profitability up 38% from 2017 from $5million previously
Future income projected between $20 to $30 million

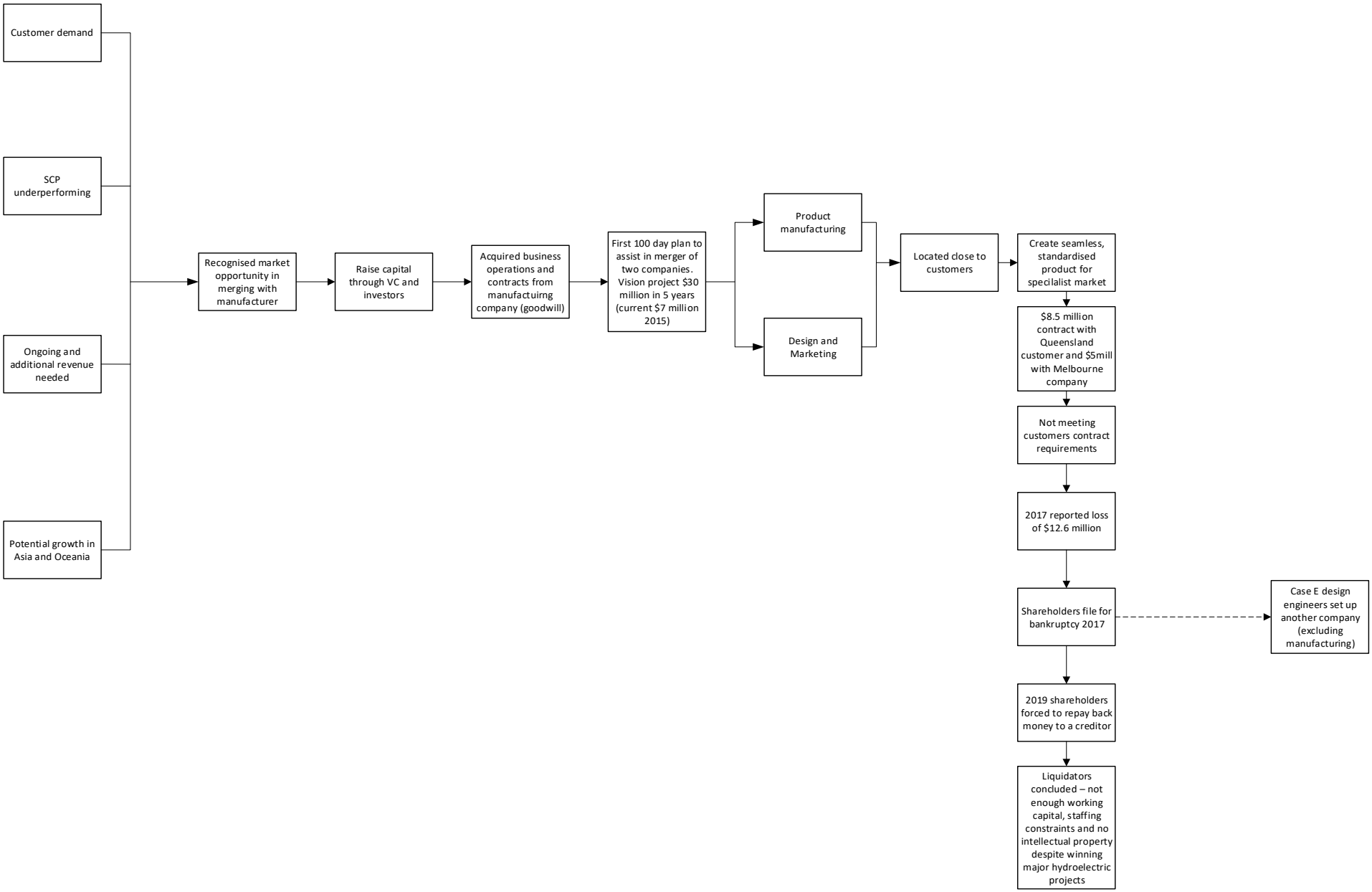
Case C


Global competition product manufacture
Falling Revenues
Increased Customer Demand for specialised solution
Technology Innovation driven
Recognise market opportunity In providing product and services (end to end solution)
Increase investment capital
Acquire company (SCP owner of design capability retiring)
Acquire software company for computer modelling engineering, structural design and analysis
Market sector focus Vertically integrate (NZ head office)
University customer "better by design"research think tanks
Employing and upskilling localised employees to consult and advise clients
Mobile technician travel world to train local service technicians
Locally run workshops for customers
Expand to new premises (NZ HQ) and organise collaborative work spaces
Prototyping with customer (customer led design)
Product/Service selling compartmentalised into 2 main groups:
Standardised packages (85%)
Customised packages (15%)
Commercialise services to expand client base by enhancing online software platform (future in software)
Aim to increase customised component from 15% to 30% where profit can be made (2015)
Monitoring and measuring performance
2018 - 30% increase in service related solutions (customised)
Revenue slightly lower from $60 mill(2016) to $54.5 (2018)
Measuring customer satisfaction through Net Promotional score scoring high in most areas and learning from lower scoring
Grow Company
Improve Centre of excellence (IOT)
Increase customised work particularly online service capabilities
More partnering and collaboration with supply chain partners
Future higher profits
Looking at implementing shift work in NZ for technicians so they can work in with clients in global timezones.

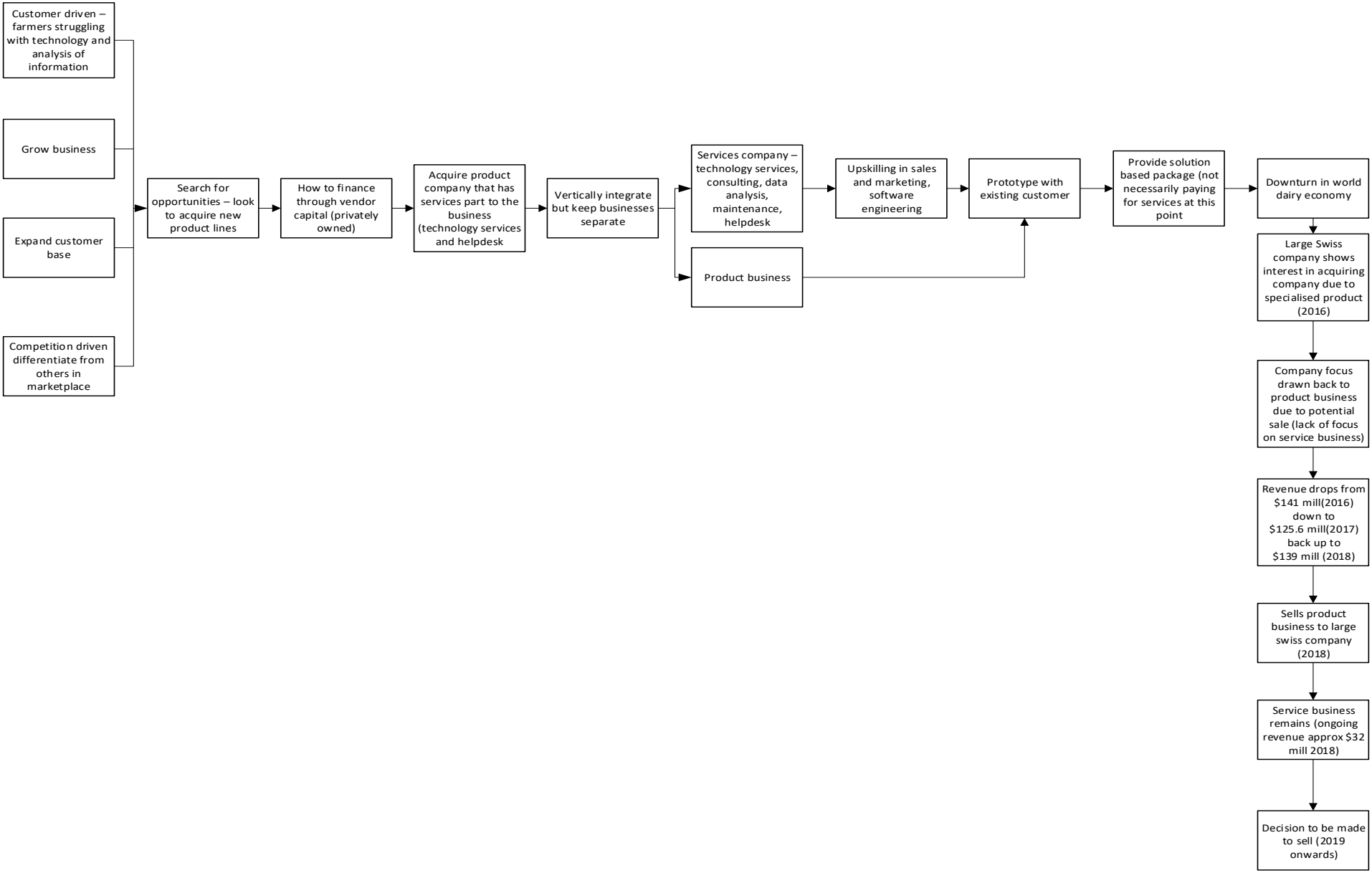
Case D


Cant compete on product alone (Asian manufacturer competition)
Dominant downstream supply chain partners mainly in beverage market
Lumpy one-off revenues (need more touchpoints with customers)
Grow number of customers (less reliance on a few)
Recognise market opportunity (large service area untapped)
Increase investment capital mainly through employing people
Vertical integration Split company into 3 divisions with holding company with primary executive team
Manufacturing product
Acquire services company (maintenance
Create finance company to allow financing of product (lease or sell)
Company grown to 300 staff – upskilling of employees particularly in marketing and sales
Formalise contracts with dealerships (Priority partnership programme) – limit sources that sell the product
Entering corporate food product market not just beverages
Now dealing directly with customers not through dealerships
Company revenue up $10million from 2016 $70 million (TIN2016)
Want to expand to Australia but cant with current model from NZ (not scalable)
Entering Australian market Joint venture with strategic partner in Australia (just signed 2018)
Co-creating with existing customers
Measuring and monitoring e.g. Manufacturing KPI's – how many units are failing?(reliability) Reaction time to call outs (delivery)
Increase profitability and revenue
More varied customers in food and beverage markets
Enter into longer term contracts with corporate beverage and food service providers
Roll out Australian business model to NZ

Case E


Customer demand
SCP underperforming
Ongoing and additional revenue needed
Potential growth in Asia and Oceania
Recognised market opportunity in merging with manufacturer
Raise capital through VC and investors
Acquired business operations and contracts from manufactuirng company (goodwill)
First 100 day plan to assist in merger of two companies. Vision project $30 million in 5 years (current $7 million 2015)
Product manufacturing
Design and Marketing
Located close to customers
Create seamless, standardised product for specialist market
$8.5 million contract with Queensland customer and $5mill with Melbourne company
Not meeting customers contract requirements
2017 reported loss of $12.6 million
Shareholders file for bankruptcy 2017
Case E design engineers set up another company (excluding manufacturing)
2019 shareholders forced to repay back money to a creditor
Liquidators concluded – not enough working capital, staffing constraints and no intellectual property despite winning major hydroelectric projects

Case F


Customer driven – farmers struggling with technology and analysis of information
Grow business
Expand customer base
Competition driven differentiate from others in marketplace
Search for opportunities – look to acquire new product lines
How to finance through vendor capital (privately owned)
Acquire product company that has services part to the business (technology services and helpdesk
Vertically integrate but keep businesses separate
Services company – technology services, consulting, data analysis, maintenance, helpdesk
Product business
Upskilling in sales and marketing, software engineering
Prototype with existing customer
Provide solution based package (not necessarily paying for services at this point
Downturn in world dairy economy
Large Swiss company shows interest in acquiring company due to specialised product (2016)
Company focus drawn back to product business due to potential sale (lack of focus on service business)
Revenue drops from $141 mill(2016) down to $125.6 mill(2017) back up to $139 mill (2018)
Sells product business to large swiss company (2018)
Service business remains (ongoing revenue approx $32 mill 2018)
Decision to be made to sell (2019 onwards)

Appendix 6: Cross-case Logic Model Summary